

ING

**THE LIBRARY**  
**THE MAGAZINE WHICH INTEGRATES MATERIAL HANDLING EQUIPMENT INTO THE FLOW OF PRODUCTION**



**EFFICIENT HANDLING OF MATERIALS SPEEDS PRODUCTION FLOW**



and



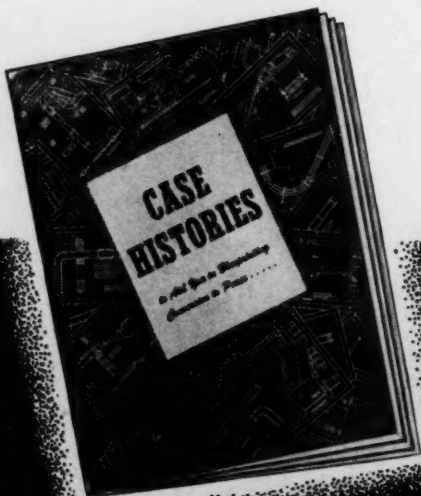
*Both depend upon*  
**THE JOB OF MANAGEMENT**  
*in Reconversion . . .*

✓ Today—management faces its crisis! Upon the speed and the wisdom with which its plans for reconversion are set into motion depend both payroll and dividend. Only the efficient can survive!

Complete mechanization, enabling the most productive use of manpower, is of primary importance. Equipment that will do it better, faster, and cheaper is the best insurance for the future.

Lamson Conveyors and Lamson Pneumatic Tubes—engineered installations of these two cost-cutters helped win many an "E" award. The same plants will have a head-start in the race for the consumer dollar—the race that has already started!

**To Assist You In Your Planning, We'd Like To Send the  
FREE BOOK "CASE HISTORIES**



to Aid You in Blueprinting Conversion to Peace . . ."  
Come inside some of America's greatest industries with us — and see how they will handle the problems of increased output at lower cost. Ask for your copy TODAY!

LAMSON CORPORATION  
1300 Lamson St., Syracuse 1, N. Y.

Please send my copy of your reconversion booklet. I'm willing to learn what your planning assistance has done for others.

Name.....Position.....

Company.....

Address.....

City and Zone.....State.....

# FREE PROOF!

## That "Muscle Mike" Can Cut Your Handling Costs in HALF!

with Industry-Tested Miracle  
Electric Truck



ONE DOES THE  
WORK OF 3!

6000 lbs. 6000 lbs.

"I'M  
MUSCLE  
MIKE  
THE BRAVNY  
MIDGET"

TO PILE  
UP 1/2 TO 2/3  
DOLLAR SAVINGS

WITH 3 TIMES LESS  
FATIGUE



## It's Yours to Use FREE in Your Own Plant For 3 Days!

to demonstrate it will cut **YOUR**  
handling costs at least **IN HALF**

All industry is using this Miracle Electric Truck. In its motor is a Muscle Mike . . . a brawny midget of electric power that moves up to 6000 pounds with amazing "touch-of-your-thumb" ease.

Its name is Automatic Transporter. You haven't a handling job it can't lick. One man or girl at the control buttons does the work of three husky laborers. That's two-thirds saving in labor alone. Forget about drudgery and fatigue. It's next to nothing. Take it in and out of tight places that would put even hand trucks

to shame. It comes through for you without a whimper.

But don't take our word for it. Put it to the test . . . put it over the severest hauling hurdles in your own plant. See if it doesn't do for you, the great job it has been doing for industry everywhere. Mail the coupon, and we will arrange delivery. First come, will of course, be first served. There is absolutely no obligation to buy . . . no strings attached whatsoever.

Remember: Only **AUTOMATIC** Makes the **TRANSPORTER**

## TRANSPORTER

A PRODUCT OF AUTOMATIC  
LIGHTENS LIFE'S LOADS

AUTOMATIC TRANSPORTATION COMPANY  
Div. of The Yale & Towne Mfg. Co.  
141 West 87th Street, Chicago 20, Illinois

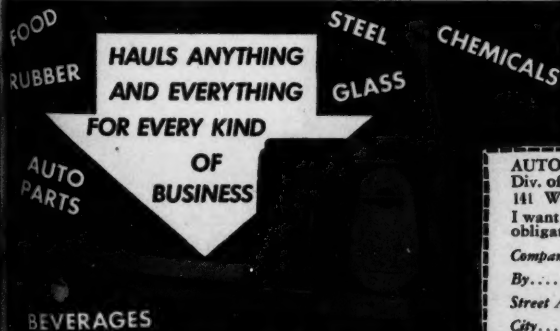
I want to put Automatic Transporter to work for me for 3 days free of all cost and obligation. Deliver it to my plant at as early a date as possible.

Company Name.....

By..... Position.....

Street Address.....

City..... State.....



DECEMBER, 1945

# In the Old Battle for New Ways

## TO REDUCE PRODUCTION COSTS

...improved materials handling, because in the past so often neglected, probably holds greater possibilities than any other element of cost in modern production.

Production has aptly been called "materials in motion"—*in* machines and processing equipment, as well as *between* them and departments for finishing, packaging, storage and shipment.

This often calls for "Cleveland" shop con-

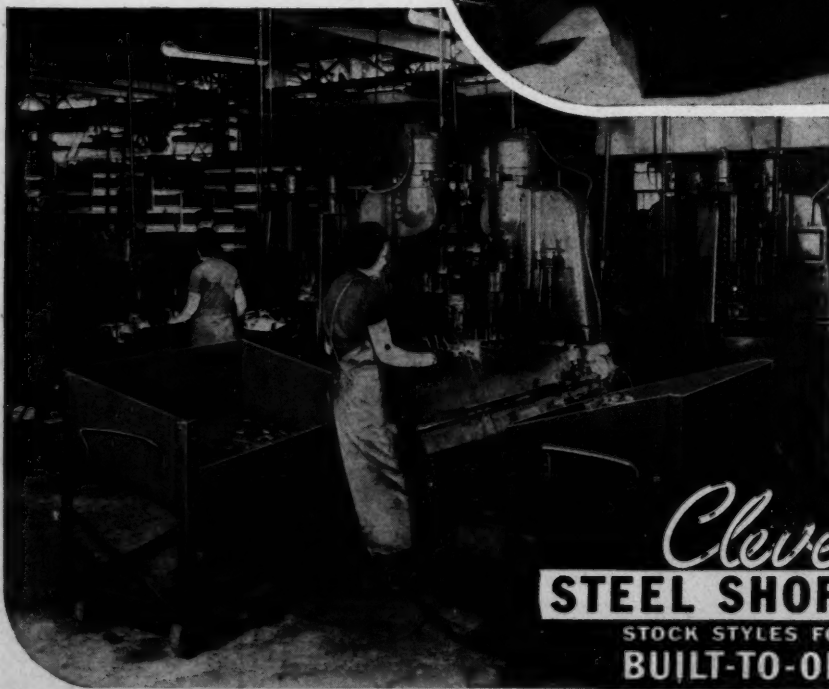
tainers and other steel equipment designed and built to fit individual needs, because the mass production of small products permits of no compromise with efficiency or fitness for their intended functions. "Cleveland" make stock as well as special sizes and models, specializing in designing and building to order to suit individual requirements.

### STEEL FACTORY EQUIPMENT DIVISION

CLEVELAND WIRE SPRING COMPANY  
2012 West 25th Street • Cleveland 13, Ohio

## ORIGINAL IDEAS!

Replacing boxes of more conventional type the Soss Mfg. Co., Detroit, uses a smaller number of relatively large capacity box trucks for most efficient handling of small products, (hinges) as here illustrated. Much time is saved by elimination of repeated pickups with separate truck and restacking. Where, as in this plant, successive operations are numerous, calling for frequent moves between machines or departments in close proximity, this idea has many advantages.



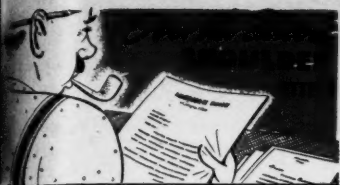
## ASK FOR CATALOG

of "Cleveland" steel shop boxes, barrels, stools, hand trucks, tool boxes and racks, bins, etc. Contains many valuable suggestions

*Cleveland*  
**STEEL SHOP EQUIPMENT**

STOCK STYLES FOR GENERAL UTILITY  
BUILT-TO-ORDER to meet special requirements





To FLOW:

*For Industries Large and Small*

The matter of handling materials, whether raw, semi-finished or finished, with a minimum of slack motion and in direct lines, will be increasingly important during the coming years. Any magazine which illustrates and describes the latest developments in this field should find a ready circulation among our many industries, both large and small . . .

We are preparing pamphlets on proper loading and bracing of different commodities in cars . . . likewise on methods of packing, and containers for general merchandise. —Edward Dahill, Chief Engineer, Freight Loading and Container Section, Association of American Railroads, Chicago, Ill.

Much valuable work is being done under the able direction of Chief Engineer Dahill on the proper preparation and handling of goods in transit. To keep readers informed on developments, FLOW will report the latest findings and recommendations of the Association's Freight Loading and Container Section.—Ed.

To FLOW:

*Classified Ad Section*

I have received the first copy of your magazine FLOW and am very favorably impressed with it.

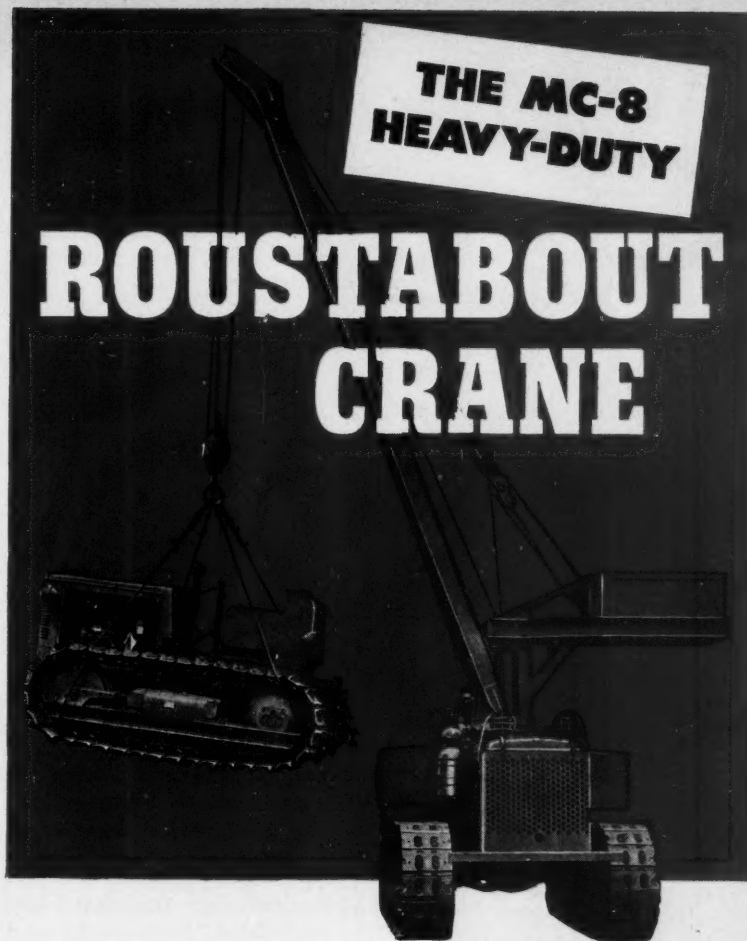
If you expect to have a Classified Section, please let me know as I would like to run an advertisement. —Milam P. Hare, 4930 McKinney St., Houston, Texas.

Reader Hare's inquiry is one of quite a number recently received regarding such a department. Classified Advertising page will be included as soon as sufficient requests from readers warrant it.—Ed.

To FLOW:

*Many Good Points*

I am sure that we will be able to derive many good points from FLOW, as we all recognize that the proper handling and storage of materials is one of the greatest prob-



**THE MC-8  
HEAVY-DUTY**

# ROUSTABOUT CRANE

**Fast, versatile load-handler  
that hustles stuff up to 10  
tons all around your plant**

**YOU** have no load-handling emergencies when you have a Roustabout — whether it's a special car or truck loading job, a heavy machine to be moved, any usual or unusual handling situation, Roustabout is where you want it when you want it, quick, powerful, low cost — saving time and manpower. Easily, smoothly, it lifts 2 tons at 27½ ft. radius, 10 tons at 9½ ft. Boom turntable and all gears run in oil; built for years of overwork. Hundreds of industries regard their Roustabouts as indispensable. Write today for full story of these money-saving wheel or crawler cranes.

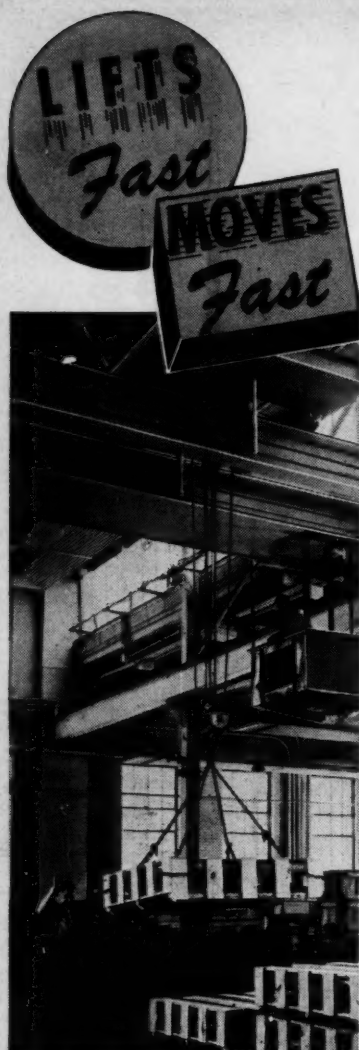
**Roustabout saves you time  
and money on these and  
many other jobs —**

- Big stuff off and on trucks, freight cars
- Moving large machines and parts
- Handling bales, boxes, drums
- Moving big castings, motors, railroad and marine gear
- Loading air transport planes
- Handling tanks, pipe, structural steel, rails, timber
- Installing heavy valves and fittings



**THE HUGHES-KEENAN COMPANY**  
648 Newman Street, Mansfield, Ohio

**Roustabout Cranes**  
By Hughes-Keenan



Here is a Reading Crane that solved a warehouse problem in the rapid handling of materials awaiting shipment.

The crane was engineered to the needs of the job—span, lift, crane drive, trolley drive, hoisting speed—from standard Reading Crane units at no extra cost. The Reading Crane unit design can save money for you in your materials handling problems. You get an engineered solution to your electric crane problem at no extra cost.

*For full information, write for the Reading Crane Catalog.*

**READING CHAIN & BLOCK CORPORATION**  
2713 ADAMS ST., READING, PA.

CHAIN HOISTS • ELECTRIC HOISTS  
OVERHEAD TRAVELING CRANES

**READING  
CRANES**

lems of all manufacturing today.

I wish you every success for your new publication.—W. S. Ransom, Easy Washing Machine Corp., Syracuse, N. Y.

#### To FLOW:

##### *Covers Vital Subjects*

... congratulate you on this fine publication. We are herewith enclosing a subscription card and are looking forward to receiving FLOW for the next two years—and longer.

We represent a number of manufacturers of material handling equipment in this part of the country, and we assure you that the initial issue of FLOW covers subjects that are of vital interest and help to our organization.—W. Blackman Davis, Wendler-Davis Co., Houston, Tex.

#### To FLOW:

##### *We Agree, But . . .*

On pages 50 and 51 in the October issue of FLOW you cover the Ohio Clay Company's mechanical handling of their product, but in the writer's opinion fail to continue at the point where the user of bricks becomes interested, that is, the method used for packing or palletizing the bricks so that they may be unloaded mechanically and quickly from freight cars or trucks.

The writer believes that the majority of your readers are interested in having material and equipment forwarded to them and packaged in such a way that it can be mechanically and economically unloaded.

Many of the smaller brick manufacturers are still using the obsolete manual method of loading cars, thus compelling the consumer to expend from 30 to 45 manhours to unload a box car of bricks and place them on pallets or skids so that they may be transported by power trucks.

The writer believes that if in a future issue you were to include an article . . . on the packing and palletizing of bricks (as employed during the war to save handling costs for our armed forces), you would be instrumental in effecting a saving in handling labor both for the brick producer (in loading) and for the consumer (in unloading). Most of the latter utilize mechanized methods for unloading cars,

even when only pallet lift trucks are available.—P. F. Nydegger, Superintendent, The Singer Manufacturing Co., Elizabethport, N. J.

*We agree, but plant improvements take a little time. The article in question was concerned primarily with handling in production, but it was explicitly stated that studies were under way to mechanize "the loading of the finished product" as well (page 57). Meantime, an article in this issue comes closer to satisfying Reader Nydegger's request. See "What Do You Know About Your Costs?"—particularly the exhibit on palletized bricks.—Ed.*

#### To FLOW:

##### *Missing . . . But Coming*

Referring to page 13 of your initial issue—"What Makes FLOW?"—one important statement is missing.

The need for reducing the high percentage of industrial accidents caused by poor material handling methods makes "FLOW" important too.

One definition of an industrial accident is, "An interruption to production." Productive flow therefore signifies freedom from accidents.—R. W. Laughlin, Resident Engineer, Liberty Mutual Insurance Co., Boston, Mass.

*Considerable material prepared on the subject of safety could not be accommodated in the first issues, but this will be included in the months ahead. The item "Rules of the Road" November FLOW, page 51, is only a small sample of the practical safety material that will be featured in FLOW.—Ed.*

#### To FLOW:

##### *A Conveying Problem*

We have recently subscribed to your magazine and are very much pleased with it.

We have a conveying problem which we would like to get some engineering firm to work out for us . . . We will have approximately 5,000 lbs. of cloth per day which we wish to convey from the weave room floor to the roof of the building and then carry about 400 feet to another one-story building where it should go down a decline into the finishing department. The

*(Continued on page 63)*



Photograph, courtesy of Etwell-Parker Company

## Palletizing Changes Square Feet to Cubic Feet!

Practically any company can save time and labor by using pallets, because they turn square feet into cubic feet when moving or storing products. Merchandise can be stacked to the roof if necessary, quickly, economically and safely.

To prepare products for palletizing, use Stanley Steel Strapping. Stanley Strapping

not only securely binds merchandise, but does it economically. Palletized material can be loaded or unloaded from trucks or freight cars by one operator in a fraction of the time formerly taken by two or more men. The Stanley System includes tools and accessories. The Stanley Works, Steel Strapping Division, New Britain, Conn.

### With Palletizing You:

- ... SAVE SPACE
- ... SAFEGUARD MATERIALS
- ... CUT HANDLING
- ... REDUCE ACCIDENTS
- ... ELIMINATE COSTLY CONTAINERS

# STANLEY

STEEL STRAPPING AND CAR BANDING SYSTEMS



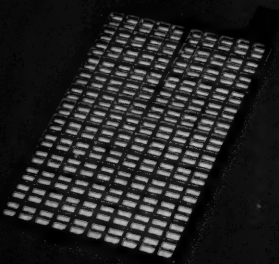


## ARE YOUR TRUCKS MAKING THE GRADE?

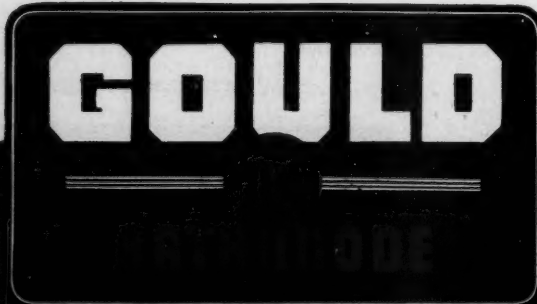
Gould Kathanode power gives your electric trucks extra flexibility. They will climb ramps to loading platforms even when heavily laden. Hoists can be operated while vehicles are still in motion.

Gould Kathanode batteries meet extra power demands. One reason is the special design of the positive grid. Among other features this has double-wedge-type members. There is ample cross-section for conductivity, yet only a knife-like edge is exposed. Peroxidization cannot reduce battery efficiency prematurely.

Investigate Gould power for your electric trucks. Write Dept. 1012 for Catalog 100 on Gould Kathanode Glassklad Batteries for Industrial Truck and Tractor Service.



**KATHANODE GRID**  
Due to a special design, the Kathanode grid retains its conductivity capacity for the entire service life of the battery.

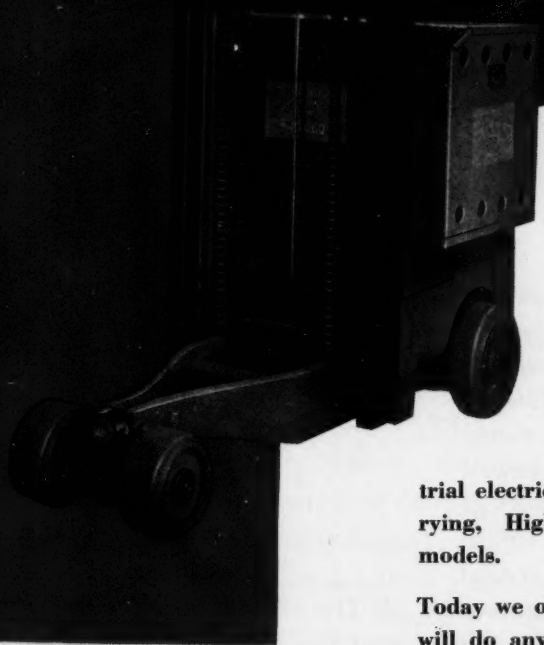




# WRIGHT

## HIGH LIFT TRUCKS

*are available*  
IN A WIDE RANGE OF  
MODELS and PLATFORM  
ELEVATIONS



### SPECIAL MODELS

For special applications we are prepared to furnish trucks which are variations from the standard line. Let us assist you with your materials handling problems.

**T**HIS company was the original manufacturer of industrial electric trucks and the name **WRIGHT** has stood for the acme in construction, ease of operation and serviceability for over a quarter of a century. We were not only the first to manufacture the (Elevating Platform type) small industrial electric truck but in addition the small Carrying, High-Lift or Tiering and Telescoping models.

Today we offer a full line of small trucks which will do any of the work of the so-called larger trucks and these are available in a wide range of models, capacities and specifications. Our catalog illustrates and describes the various models. Write for your copy for reference.



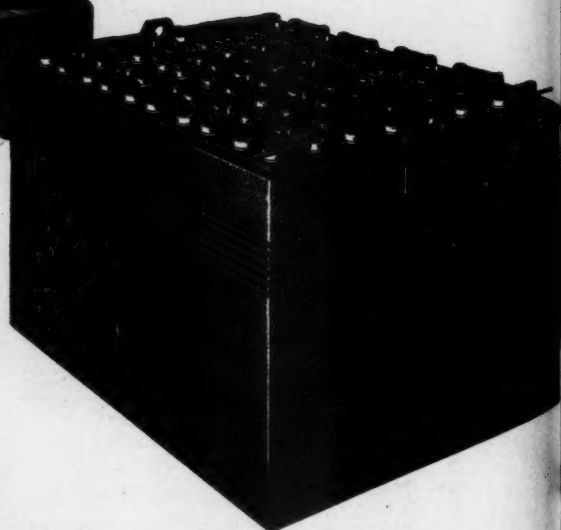
ELECTRIC TRUCK CO., INC.  
NEW YORK

# MODERN HANDLING METHODS



## Now a Must!

There's no time to lose in getting operating costs on a competitive peace-time basis. Modern methods of handling are now a *must*. Electric industrial trucks, for example! Palletized loads! And, of course, the newest development in motive power Storage Batteries . . . the sensational Philco "Thirty" that gives 30% longer life! Try Philco "Thirty" in your hardest-working trucks. The tougher the job the better it shows up. Write for the facts today.



● The new Philco "Thirty" Industrial Truck Storage Battery, that gives 30% longer life, is identified by its distinctive red connectors.

# PHILCO

*Famous for Quality  
the World Over*

PHILCO CORPORATION • STORAGE BATTERY DIVISION • TRENTON 7, NEW JERSEY

# Flow

The magazine which integrates material handling equipment into the flow of production.

Vol. 1, No. 3

DECEMBER

1945

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The Staff—CURTIS H. BARKER, JR., Consulting Editor; MANFRED SCHUELER, Editor; C. BERENS, Associate Editor; WM. V. LINAS, R. EVERETT, ARTHUR A. BOUHALL, NORMAN TAYLOR, Production Department; L. N. FLINT, B. WOLFE, B. FRITCHIE, Special Service Department; E. J. HEXTER, I. GRABOWSKI, E. KOBLENTZ, V. JAN-  
NING, C. BELL, Circulation Department.

FLOW EDITORIAL AND BUSINESS OFFICES—  
812 Huron Road, Cleveland 15, Ohio.

NEW YORK OFFICE—CHESTER RICE, 60 E. 42nd  
Street, Room 950, New York 17, New York. Mur-  
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Lake Street, Room 1110, Chicago 1, Illinois.  
Andover 4972.

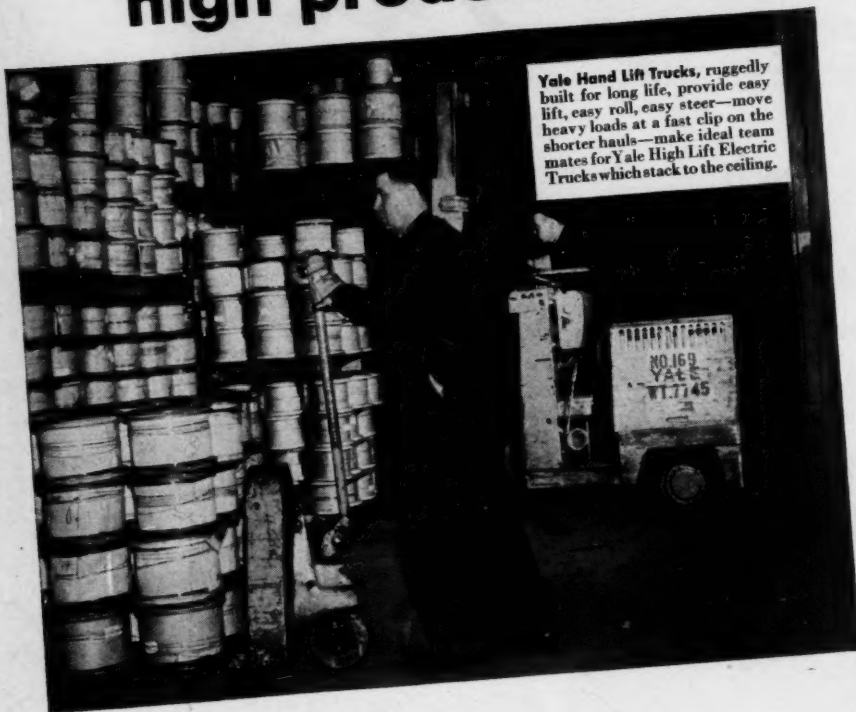
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COVER PHOTO—Metals that only recently went into machines of war can once again be used for small-scale machines that will delight Americans this postwar Christmas. And millions of purchasers can today buy these and many other toys because of the mass-production economies provided by mechanical handling devices.

# Teamed up to beat high production costs

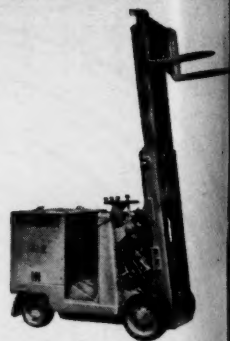


**Yale Hand Lift Trucks**, ruggedly built for long life, provide easy lift, easy roll, easy steer—move heavy loads at a fast clip on the shorter hauls—make ideal team mates for Yale High Lift Electric Trucks which stack to the ceiling.

● Here is a great machine-team for keeping production on the move, and beating down production costs. You'll find similar Yale Hand Lift and Electric Trucks operating in countless plants, handling raw materials, goods in process, finished products—a vast tonnage from shift to shift.

Let a materials handling team like this help you get rid of *hidden costs*—by reducing the time and effort expended in lifting and moving. From Yale's complete line of fast-operating, easy-to-use, "safety first" hand lift and electric trucks, hand and electric hoists, and Kron scales, you can select equipment which will pitch right in and help you cut production costs and step up output by solving your materials handling problems.

Get all the facts about cost-cutting Yale Materials Handling Machinery. Phone our nearest representative or write to The Yale & Towne Manufacturing Company, 4530 Tacony Street, Philadelphia 24, Pa.



**Yale Electric Industrial Trucks** save time and effort—are power-packed to speed the movement of tremendous tonnage per day—travel fast and maneuver easily in congested areas. High lift models save stacking space.



**Yale Hoists**—hand chain and electric models—are efficient time and labor savers that make light work of heavy lifting jobs—conserve worker energy, speed production and maintenance and cut handling costs.



**Kron Springless Dial Scales**, made by Yale, eliminate excessive time and money-wasting handling operations, provide accurate, efficient low-cost weighing and counting of all kinds of materials. Available in all types from bench to crane scales.



## MATERIALS HANDLING MACHINERY

CUTS PRODUCTION COSTS. SAVES TIME... SAVES EFFORT... PROMOTES SAFETY



HOISTS—HAND AND ELECTRIC • TRUCKS—HAND LIFT AND ELECTRIC • KRON INDUSTRIAL SCALES



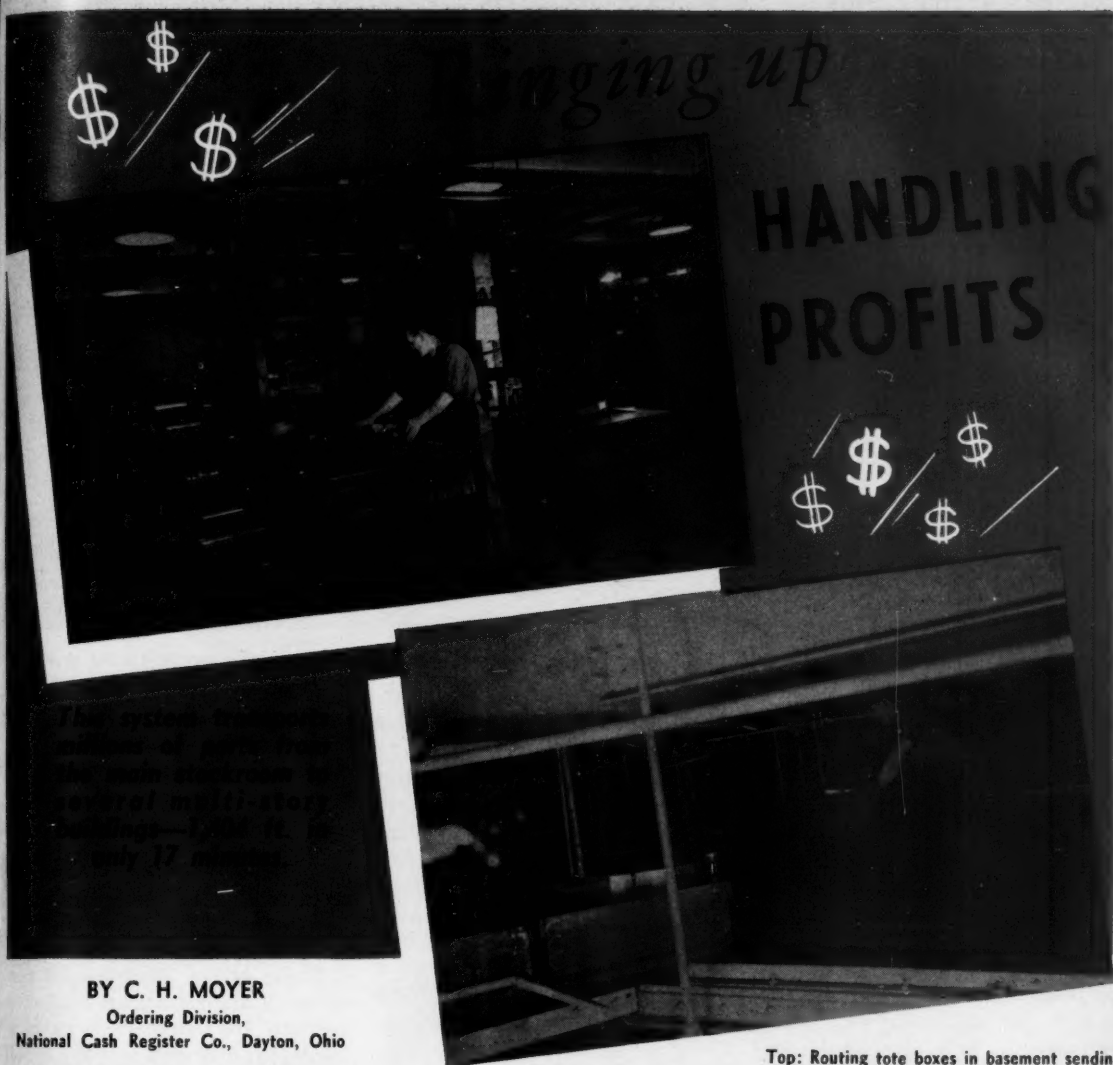
Trucks save  
power-packed  
of tremen-  
—travel for  
in congested  
save storage

in and elev-  
ent time and  
e light work  
—conserve  
production  
cut handling

Scales, used  
excessive time  
handling opera-  
te, efficient  
counting of  
Available in  
crane scale



SCALES



Top: Routing tote boxes in basement sending station. Lower: Operator in transfer booth.

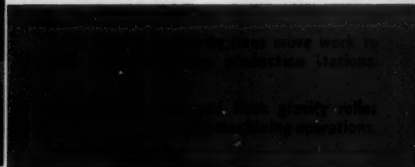
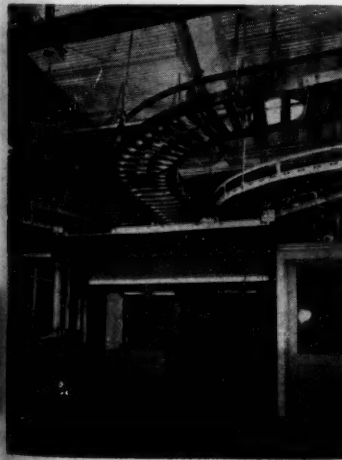
BY C. H. MOYER

Ordering Division,  
National Cash Register Co., Dayton, Ohio

A SYSTEM of vertical and horizontal power conveyors with transfer stations moves the major portion of work in process at our company.

Vertical conveyors are located near the center of each building extending from the basement to the top floors with a "take-off" at each floor. All stock is carried in standard "E" and "C" size wooden tote boxes. The destination of moving stock is indicated by a tracer card which accompanies the stock at all times. Each box of stock is routed over the conveyor system by means of a "conveyor routing card". Its color indicates the building and a code letter designates the specific department.

The "take-off" is controlled by means of a lever setting at each loading station. The "take-off"



Nation.

As  
the  
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our co



DEC

XUM

# Ringin' up

## HANDLING PROFITS



**This system transports millions of parts from the main stockroom to several multi-story buildings—1,404 ft. in only 17 minutes.**

**BY C. H. MOYER**

Ordering Division,  
National Cash Register Co., Dayton, Ohio

**A** SYSTEM of vertical and horizontal power conveyors with transfer stations moves the major portion of work in process at our company.

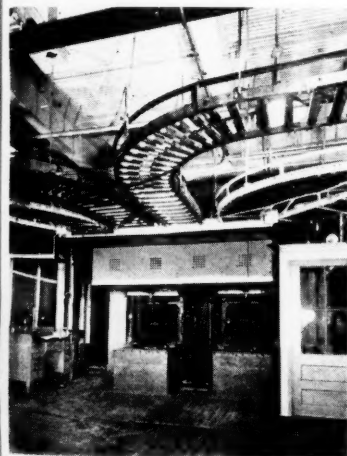
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**Left: Overhead gravity lines move work to belt lines that serve production stations.**

**Right: Stock, received from gravity roller conveyor, is moving to machining operations.**

**Top: Routing tote boxes in basement sending station. Lower: Operator in transfer booth.**

The "take-off" is controlled by means of a lever setting at each loading station. The "take-off"



ejects the boxes automatically on a gravity roller conveyor, which in turn discharges onto an overhead horizontal conveyor. The latter moves the stock to all buildings.

Roller spiral conveyors are used for storage purposes at the end of each horizontal line. Leading from the spiral storage conveyor, low-level roller conveyors are used for the distribution of stock throughout the department. The operators at the transfer stations re-route the stock on the horizontal lines to other transfer stations and buildings.

Practically all parts in process requiring a washing operation are placed on the conveyor and carries to a central washing station, where the work is placed into the washing machine (a revolving spiral type). The empty tote box travels to the discharge end of the washing machine; the positive sequence of stock being discharged is maintained and each lot of parts is placed into the same box along with the tracer card. The carrier continues to a belt incline which elevates it to the overhead horizontal conveyor, and from here it follows the routing outlined above.

#### Typical Handling in Departments

In the burring, reaming and drilling department a typical feed and movement of material can be observed. As the loaded tote boxes arrive on the belt line, they are discharged at the proper connecting roller conveyor serving the different lines.

The machining tables have a slot



Space saver: long bar stock can be loaded in narrow aisle because rack is set at angle.

cut in them at each work station. The box of pieces to be machined is taken from the roller conveyor and the pieces are removed for machining. The empty box is then set on the lower level of the table, opposite a trough connected to the slot. As the pieces are machined, they drop through the slot into the box, which is set between two angle iron guides. The left guide is bent into a slight curve and protrudes about two inches over a belt conveyor. The full box receives a push from the operator's foot which sends the carrier on the belt conveyor. It is the curve in the angle iron guide that turns the box so that it will

ride the conveyor line in the desired direction.

Another belt line intersects with the conveyors carrying work away from the different stations. As the boxes with the machined pieces approach the intersecting "take away" conveyor, they enter upon sections of roller conveyors which are controlled by guides installed on the take away line.

These guides, consisting of two pieces of angle iron, are stationed between the approaches to each machining line and act as "traffic cops". No boxes can enter upon the take away conveyor until the way is clear.

(Continued on page 47)

Controls keep center tote box waiting until take-away line is clear.

Myriads of parts in the rivet dept. travel in these suspended carriers.







Above, bulk packing conveyor line increased production up to 400%.

## When Repacking *is* necessary

To speed the flow of materials to world-wide fronts, the Navy mechanized its packing operations—a wartime story with pointers for you, today.

BY RICHARD D. ELWELL

Associate, McKinsey & Co.,  
Formerly Officer in Charge, Field Activities  
Unit, Container Section, BUS&A.

**W**ORLD WAR II, a war of supplies, highlighted the importance of proper packing and packing that had to stand up under unusual conditions. These conditions resulted from the shipping of huge volumes of materials all over the world, which involved storage in the open under extreme conditions of humidity and temperature, and severe handling. Thus proper packing was a major consideration.

Whenever possible or practicable



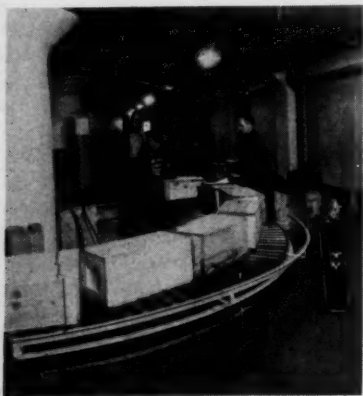
Photo at left shows work delivered to packing benches on standard pallets.

Electric eye control for intersecting powered lines is shown in photo at right. See "Mechanically Speaking" section for additional details.

able, the Navy shipped stores and materials in the original packing provided by the manufacturer in accordance with the specifications developed by the Navy. But in a large percentage of cases the requisitioned quantity did not conform to the quantity packed by the original sender, which was particularly true of general stock items. In such cases it became necessary for the Navy to repack the shipment.

### Mechanized to Meet Modern Needs

In order to handle this heavy load effectively, the Bureau of Supplies and Accounts modernized the packing equipment at naval supply depots, yards, and other activities with the installation of



Strapping and weighing on assembly packing conveyor. See the section on "Special Features" regarding efficient accessories.

two types of packing conveyor lines.

In most cases, naval stores and materials were shipped in nailed wood boxes, either in style two or four. V-board and W-board containers were also used, particularly for clothing, small stores and provisions. For domestic shipment, domestic fibre board or corrugated containers were used at times. But in view of the heavy handling which naval stores and materials underwent, stronger containers were usually required. Another reason was that it was not always possible to determine the ultimate destination of the goods when they were first packed for shipment.

Prior to the modernization program, it was customary for the packers to make up their own nailed wood boxes and also to per-

form most of the operations, including the cutting of the stencil and the stenciling of the boxes. This involved much needless transporting of the individual units. Example: In order to obtain the weight of a box, it was necessary to place it on a hand truck and move it to the scale; in order to stencil, the same maneuver was required to wheel the box to the sten-

### Mechanically Speaking

Intersecting sections of the powered conveyor lines were controlled by photo-electric cells. The latter were so adjusted that they stopped the powered spur lines when there was danger of collision between boxes. The photo-electric cells were enclosed in metal shields and mounted on the side of the conveyor, in order to insure protection from boxes.

The powered conveyors were provided with frames which held the tension roll in such a manner that they could be dropped at will by the use of levers mounted at the side. This permitted turning any powered section into a free-rolling conveyor, providing extreme flexibility. This was an advantage when it was desired to insert an operation along the line—the nailing of box tops, for example.

A Reeves drive on the powered conveyors permitted eight variations of speed. Ordinarily, once the correct speed had been determined for a particular class of work, variation of belt speed was not required unless there was a drastic change in the type of stores (and hence in the size of boxes).

Adjustable supports were provided on each of the 4' and 10' conveyor sections, permitting the height of the conveyor to be adjusted to the average box size at a particular activity. Readjustment was seldom necessary once the optimum height had been determined.

The complete interchangeability of the 10' and 4' sections was another notable feature of the conveyor line. The drive units were 4' in length, the take-up units 2'. The free rolling sections are drilled so that the frames can be installed, allowing for tension rolls to be mounted, and thus permitting powerization of free-rolling sections when necessary. As most naval buildings used for packing had columns spaced on 20' centers, the interchangeability of these sections has provided the necessary flexibility required by this building condition.

cil-cutting machine. Strapping tools and rolled strap could not be provided for each strapper, and needless delay often occurred in obtaining the necessary equipment and materials.

The new layout, which involved two packing conveyor lines, was standardized in most naval activities. The bulk or semi-bulk items,

involving large boxes and crates or items of considerable weight, were packed on a bulk packing line. This line was not powered and differed from the small-box packing line mainly in the fact that the conveyor was mounted close to the floor. This permitted the packers to work conveniently on the large-size boxes and crates. The smaller boxes were packed on a standard conveyor line. This one, powered in part, was set at a convenient height, usually 22 inches.

In contrast to the old method, the various operations in the modernized conveyor line set-up were segregated. Each operator was provided with all the necessary equipment and supplies, so that he could complete his operation without leaving his station.

Following are the details of the various operations.

### Packing, Strapping, Weighing

After checking the items against the invoice listing, the operator packed the items in a wooden box or in a prefabricated corrugated container, and affixed the cover. Standard-size boxes were used, either style No. 2 or 4, so designed as to form pallet patterns on the standard Navy 48" x 48" pallet. When necessary, a sealed waterproof and pre-constructed bag liner was placed in the box. All the supplies required for the packing operation were kept adjacent to the desk.

The strapping was centralized at the end of the conveyor line, where the operation was performed by operators who specialized in this work. Boxes were transported to this station by powered conveyor, which had a free-rolling section.

The scale was inserted in the conveyor line. The weight of boxes passing over the scale was recorded by the weigher, who marked it on the box and on the invoice.

### Stenciling

This operation was divided into stencil cutting and stencil marking. Pre-cut stencils were used for the "from" and also usually for the "destination" stencil. The one giving the weight, cube, bill of lading number, etc., was usually cut for each invoice. This may of course be pre-cut prior to reaching the

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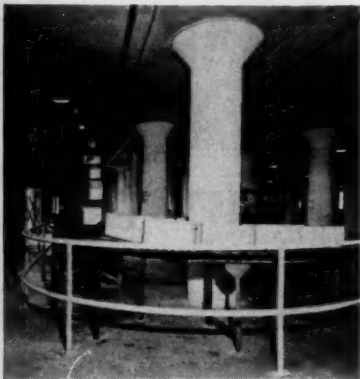
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stenciling operation to save time.

In large lines, the marking operation was also segregated. That is, one marker handled all the "from" stencils, another the "destination"



This powered inclined conveyor leads to shipping dept., where palletized loads are made.

stencils, and a third those used for "information."

#### Loggers and Out-Going Checker

The loggers recapped the total weight, the cube, destination, date of packing, packer's name, etc., working from the invoices which accompanied each lot of boxes.

The out-going checker checked the box markings against the invoice. He also directed palletizers on which pallets to place the boxes, as determined by the assembly requirements of the various transit areas. The out-going checker stapled the necessary papers to each finished pallet.

#### Palletizers

These operators did the physical work of placing the completed boxes on the pallets by rough destination. This permitted the pallets to be transported to the shipping section as quickly as possible.

#### The Use of Spurs

The spurs were one notable feature of the conveyor line. (See "Mechanically Speaking" for other features.) Their use is often misunderstood. It was important that the invoice, together with all the boxes for it, reach the stenciling section at the same time. The spurs enabled the packer to keep the finished boxes in a segregated location until all units for a particular

invoice were completed. In most cases there were not more than two or three boxes per invoice, so that plenty of room was available on each of the spurs. For larger orders, two or more spurs were assigned. When all the boxes for such orders had been completely packed, they were pushed by the operator to the powered conveyor. The latter transported them to the free-rolling section, where the strapping, weighing and stenciling operations were performed.

Without such spurs, it can readily be seen, boxes from several separate invoices might reach the stenciling section at the same time. This would make it extremely difficult for the stencilers to perform their work.

#### A Balanced Line

"Balancing" of the conveyor line is important. The number of operators doing the actual packing must be balanced against the number of strappers, weighers, stencilers, loggers, checkers and palletizers at the end of the line. In this way a steady and free flow of packed boxes can be maintained. Normally, once the lines are balanced for a particular flow of work, reassignment of personnel is not necessary unless the volume drops or increases sharply.

#### Special Features

As can be seen from some of the photographs, the strapping tools at the strapping stations were hung from pivoted arms and counter-balanced in such a manner that they could be swung out of the

way when not in use. Wherever ceiling height permitted, the end and strap were mounted on the ceiling. This provided a more ready accessibility to the strap and kept the space around the strapping station clear.

Special tables had been designed for the stenciling operation. These provided space for the stenciling machines, with a drawer underneath for the cuttings. Shelves were also provided for storing "from" and "destination" stencils.

At the palletizing stations (in naval activities where the packed boxes averaged over 150 lbs. each), an electric monorail hoist (or an electric crane) was installed in such a manner that the boxes could be swung from the end of the conveyor lines to the pallets. Women can perform the palletizing operation when this equipment is supplied.

In some naval activities, it was found advantageous to perform the logging, checking, and palletizing operations on the first floor, maintaining the conveyor line set-up on the second floor. In this case, the boxes were conveyed to the first floor by means of an inclined crepe belt type powered conveyor connected to a free-rolling gravity conveyor, at the end of which the final palletizing was performed.

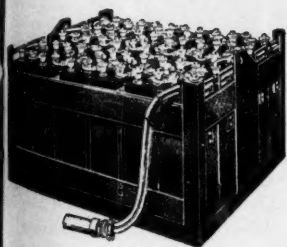
Packing conveyor lines, installed at numerous naval supply depots in this country and abroad, have been uniformly successful in enabling these activities to handle the heavy packing loads in minimum time. In general, the overseas installations were not as elaborate as these domestic operations but the basic fundamentals were incorporated. Increase in production of from 100% to 400% have not been uncommon. Not only has this enabled the packing sections to handle the heavy load placed upon them, but it has also enabled them to meet the packing specifications set for the packing of naval stores. Quality of packing is important if damages are to be eliminated, and powerized packing lines have proven their worth both in increasing the physical flow of stores and materials, and also in improving the quality of the packing.



Stenciling, logging, final checking operations.



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*Up..Up..and Away!*



**Overhead rail and hoist equipment facilitates and speeds the handling of some 6,000,000 lbs. of stock monthly in this steel warehouse.**

**E**VERY inch of valuable storage space in the warehouse of the Hamilton Steel Co., Cleveland, is covered by means of overhead handling devices, making possible efficient space utilization and warehouse operations. Sheet metal, round and flat bar stock, round and flat tubes, and coils of strip steel are the principal items warehoused.

Transfer bridges with underslung trolleys, serving as end trucks, are in fact hand-propelled cranes with two-ton chain hoists. These bridges travel the bays in the storage area on arch beam trackage. The traveling carrier, which supports the hoist, moves across the bridge to every nook and corner. Transfer points, where switches enable the carrier and hoist to ride from one bridge to another, permit material to be transported from bay to bay.

#### **Monorail Feeder System**

The unloading docks which receive material from incoming freight cars are serviced by overhead monorails, which are also used as trackage for the traveling carriers and chain hoists. Because the overhead monorail system also in-

Left: Bar stock brought from freight car by truck is shown being picked up by hand-propelled hoist.



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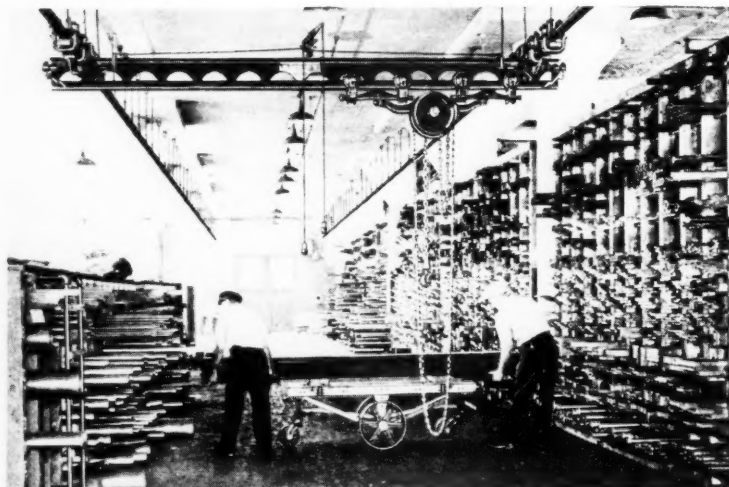


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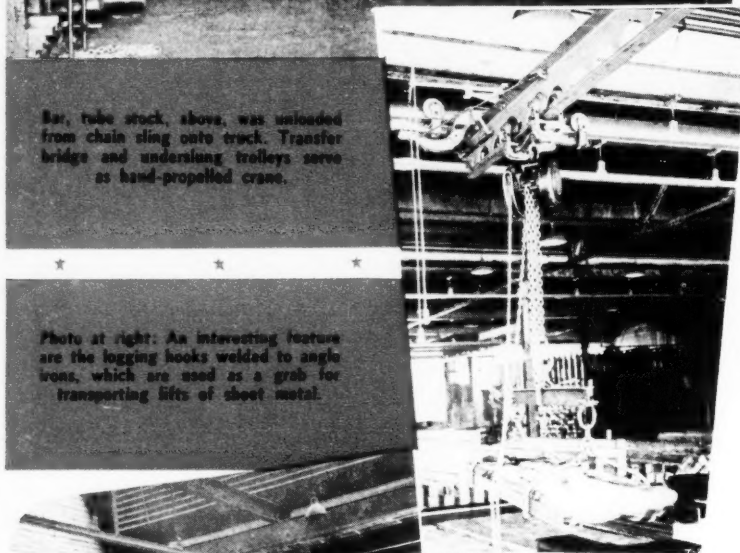
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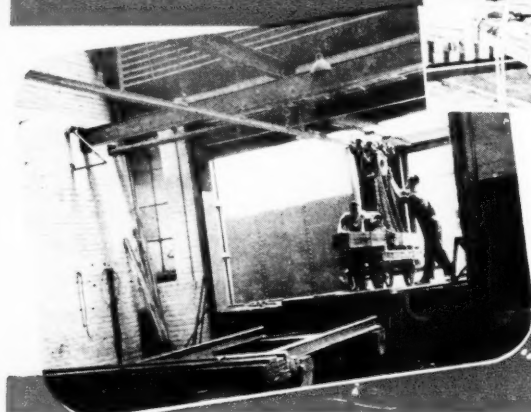


*Overhead rail and hoist equipment facilitates and speeds the handling of some 6,000,000 lbs. of stock monthly in this steel warehouse.*



Bar, tube stock, above, was unloaded from chain sling onto truck. Transfer bridge and underslung trolleys serve as hand-propelled crane.

Photo at right: An interesting feature are the logging hooks welded to angle irons, which are used as a grab for transporting lifts of sheet metal.



Left: Bar stock brought from freight car by truck is shown being picked up by hand-propelled hoist.

**E**VERY inch of valuable storage space in the warehouse of the Hamilton Steel Co., Cleveland, is covered by means of overhead handling devices, making possible efficient space utilization and warehouse operations. Sheet metal, round and flat bar stock, round and flat tubes, and coils of strip steel are the principal items warehoused.

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#### Monorail Feeder System

The unloading docks which receive material from incoming freight cars are serviced by overhead monorails, which are also used as trackage for the traveling carriers and chain hoists. Because the overhead monorail system also interlocks with the transfer bridges, it is a simple matter to transport

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Hoist on traveling beam; with underslung trolleys these make "crane" for moving bar stock.

heavy material from the unloading dock throughout the shop.

The absence of floor obstacles (due to this overhead carrying equipment) makes both the maximum use of floor area and unobstructed aisles a reality. Aisle space is at a minimum, since the stock pile, if not racked, is accessible from above.

#### Moving Sheet Metal

Sheet metal generally is brought into the warehouse by highway trucks in packs of multiple lifts. The trucks are driven into an area directly beneath the overhead chain hoist, where the lifts are removed one at a time from the pack.

The full size packs are divided into two or more lifts by the use of separators. These consist of dry lumber one inch thick and two to four inches wide. They are spaced vertically above the lengthwise skids the full length of the steel. A lift up to 3,000 lbs. is transported by the chain hoist to the storage area.

Two sets of tongs are used to move sheet metal—one for stock 18 to 30 inches wide, the other for stock measuring from 30 to 42 inches wide. The construction of these tongs is similar. Each has a spreader beam with an eye through which the hook on the hoist is threaded. A clevis is hooked on the spreader beam at each end, and two logging hooks hang from the rings held by each clevis. Welded to the logging hooks are angle irons, which aid in grabbing the lifts of sheets at the

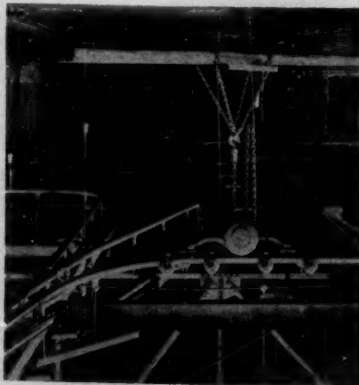
sides as well as underneath.

#### Coils of Strip Steel

Coils of strip steel also arrive by over-the-road trucks, which are loaded according to the common gondola (cylinder) method. By use of a hairpin hook, the overhead hoist unloads approximately 3,000 lbs. at a time. When coils are shipped from the warehouse they are likewise loaded according to the cylinder method.

#### Bar and Tube Stock

Bar or tube stock is brought to the receiving platform by freight car. The stock is unloaded on hand trucks and pushed into position under the hoist. (The monorail extends to the platform.) A single or a double chain sling is generally used to hold this kind of stock. However, rope slings, consisting of two loops of manila rope, are used



By means of pendant-controlled transfer switches, hoist is routed from one monorail to another. Here it is carrying bar stock.

on round and oily products. The rope prevents slipping of the soiled and highly polished pieces, and also eliminates marking or scratching. On some bar and tube stock a wire rope sling is found to be more efficient, although it is not used on flat bar or tube stock.

All bar and tube stock is racked. These racks are sometimes loaded directly from the sling and hoist in one operation, thus saving the time that would be consumed in piece-by-piece handling. The racks extend to within a few feet of the ceiling and make possible the orderly storage by size of large quantities of stock.

Racking manually piece by piece is necessary only in one bay where small bars are stored. A wooden horse with a platform on each side is moved into position to expedite the handling when the higher racks are loaded.

Thus, practically the entire material handling operation functions by means of the overhead transportation system. The use of hoists and slings permits the movement of large and heavy pieces in fewer loads and helps overcome handling problems in this steel warehouse.

#### MOVING OPERATORS TO WORK

IN a small forge shop it was the practice to place the forgings on skids after they were drawn on the hammers. An overhead crane later removed the forgings to an area set aside for inspection and layout.

The delays in getting material to this station resulted in waiting time. After inspection and layout, the skids had to be unloaded by the crane before other forgings could be brought from the hammers. The crane operator and ground crew were not always available because they had other work to do.

Then it was decided to bring the operators to the work, instead of bringing the work to the inspection and layout men. As a result, the men now spent only two or three hours daily at the skids near each of the three hammers. The time it took them to walk from hammer to hammer was insignificant as compared with the time it required previously to move the numerous pieces on many trips to an inspection station several hundred feet distant.

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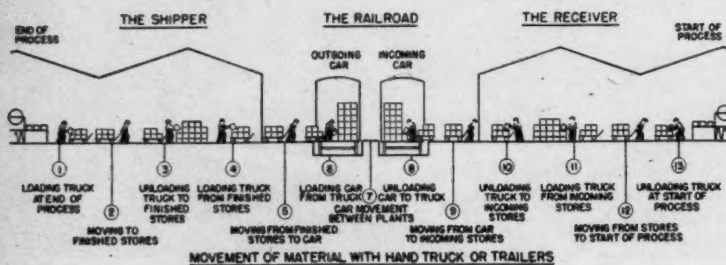
Nothing beats a B-G Bucket Loader for reclaiming bulk materials from stockpiles. It's fast, easy to maneuver, and gives many years of trouble-free, economical service. Built in various sizes and models.

## Barber-Greene Constant Flow Equipment



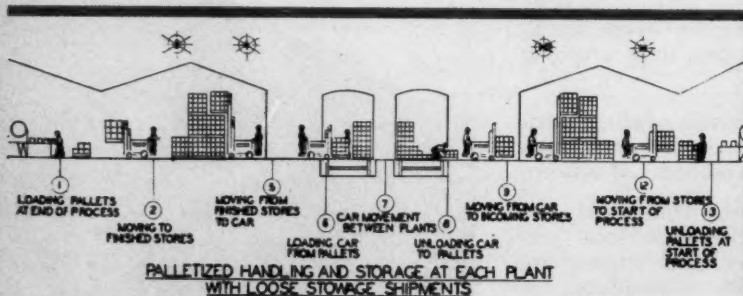


# What, Why, **WHERE** ...and How?



Above: Chart 1—13 operations to the start of the processing all but five of these are handling.

Below: Chart 2—Four handlings have been eliminated.



Below: Palletized loads are manually loaded to cars or conveyors.



**W**HAT makes the Science of Material Handling? It is common sense coupled with a knowledge of available equipment and how it can best be applied, plus a good measure of ingenuity and initiative. Since handling problems are not solved in most instances by the use of formulas, it is well to be familiar with *all* the *alternative* methods, and the conditions under which each method might prove most efficient.

Let us first analyze the most common practices employed in the flow of goods from the shipper to the receiver, and then consider what improvements could be made.

## When Minimum Investment Is Uneconomical

In Chart No. 1 there are 13 operations—representing a minimum—from the end of the processing oper-

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There are a number of alternative methods of handling packaged goods by rail between plants. This would indicate that all types of equipment may be profitably employed when they are correctly applied to each job.



The General Electric Co.

Chart 3 Below—13 operations now 7—Continuous flow by conveyors between two areas. Above: a conveyor handling scene.

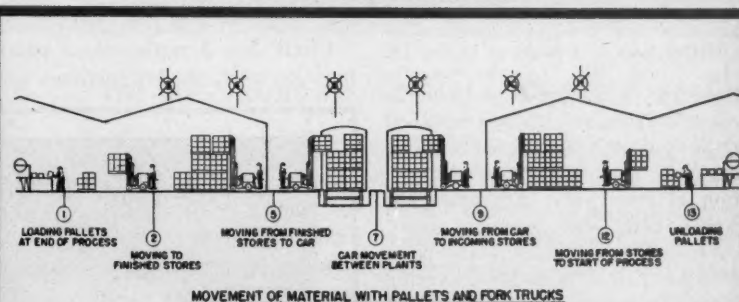
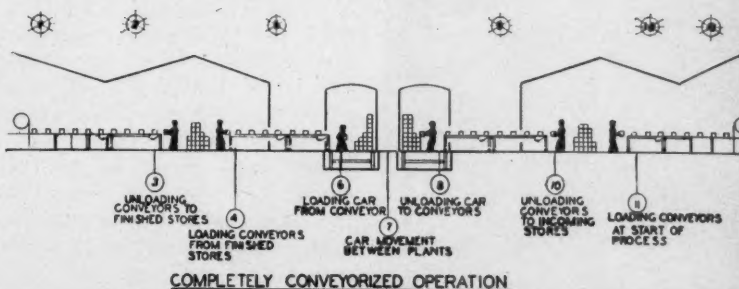
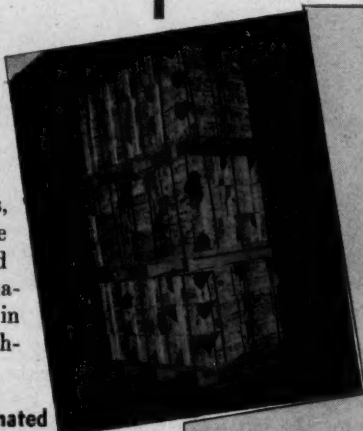


Chart 4, above—13 operations, now 7—Palletized load movement. Left, Typical steel strapped pallet load.



have buildings with good floors and plenty of headroom. And we want to reduce the individual handling (of the tubs) to a minimum, also the damage and the cost. We also want to utilize the headroom in storage. Hence our operations might be represented by Chart No. 2. In following this method, we have eliminated four handlings, which are usually performed unnecessarily. These operations are indicated

ations at the shipper's plant to the start of processing at the receiver's plant. All but five operations are *handling*, involving the picking up and setting down of each individual box or carton.

This method requires a minimum investment in equipment, but a maximum operational labor cost. This cost, unfortunately, in many instances becomes buried as *indirect labor expense* in a pooled expense, with the attention remaining focused on *direct expense*. Under such conditions the importance of material handling is lost sight of. And, beyond the excessive costs, such operations are slow, limit the output and are usually accompanied by a very poor utilization of space and labor.

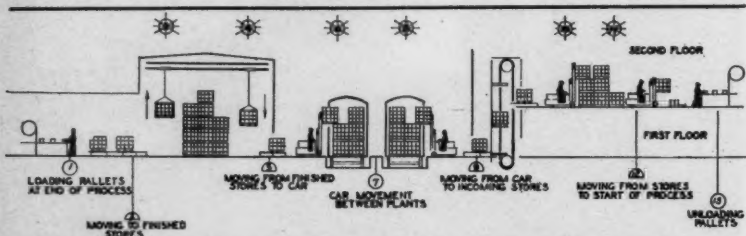
Unfortunately, we find many receiving departments, stockrooms and shipping departments with equipment unsuited for moving palletized loads directly in or out of freight cars with either powered or hand equipment. Too, the products involved may be light and bulky, and the lost cube due to pallets may prevent obtaining the minimum weight in cars, and therefore prove uneconomical. A good example of this situation is encountered in the shipment of washing machine tubs.

Four Handlings Eliminated  
Yet, in many instances, we

above the chart of the improved flow.

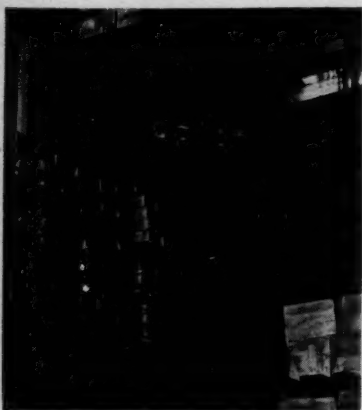
### Continuous Flow Method

Now study Chart No. 3. It illustrates the methods that might be



The chart above illustrates the handling of palletized loads under a variety of conditions.

used where there is a continuous flow between two points or even



Interior of cube: Overhead crane is stacking palletized loads to a height of approx. 24'.

two areas. This applies particularly when the product can be assembled or packed on a conveyor line. This handling may involve a combination of conveyors. Examples are power belt, slat, gravity roller, chutes, etc., with individually powered portable sections for delivering direct to any bay in storage and into the ends of freight cars.

By analyzing this chart, we see that it is possible to eliminate six of the operations performed in Chart No. 1. Conveyors are particularly economical for a multi-story operation and offer a minimum potential of work per man-hour at each handling point. The portable individually powered conveyor sections illustrated can all be started or stopped from the end-point where the stacking is being performed. In the illustration the incoming boxes have moved on a conveyor system all the way from a freight car to the fourth floor storage.

### 13 Operations Reduced to 7

Now let us assume we have a combination of an intermittent irregular flow of great volume and variety. With modern facilities,

mobile equipment can be used advantageously. You will note that Chart No. 4 is planned for palletized load movement, which may result in a variety of types of unit loads. Examples: 1. Strapped to dunnage. 2. Loose on pallets. 3. Glued to pallets. 4. Steel-strapped to pallets. It was demonstrated even before the war that a wide variety of conditions can make possible a most economical operation in the shipment of unit loads. Note that 13 operations in Chart No. 1 have been reduced to seven—the same number eliminated in the fully conveyORIZED arrangement shown in Chart No. 3.

### Some New Features

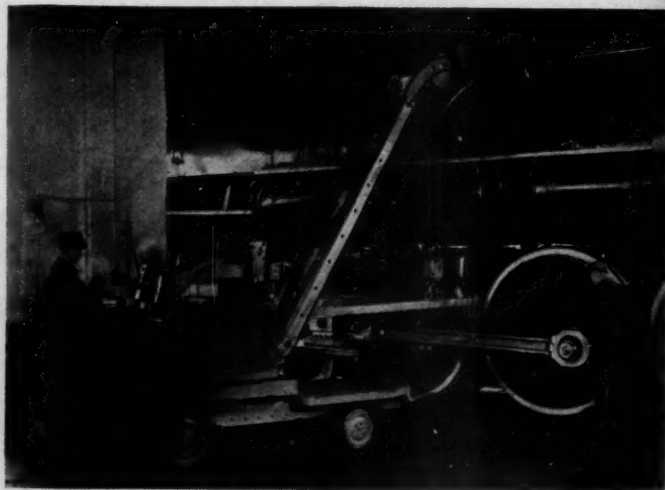
Chart No. 5 represents a combination of all modern methods ap-

plicable to packaged goods under a variety of conditions. The new features of this layout are the pallet gravity conveyor, the continuous vertical pallet conveyor, with automatic loading and discharging for multi-story operation and the tiering of pallets by means of an overhead traveling crane in a building with exceptionally high headroom. With seasonal products, provision must be made for heavy storage accumulation. This combination eliminates the same operations as the layout in Chart No. 4, and the pallet conveyor reduces the length of the possible move operations 2 and 12.

### All Types Have a Place

It must be borne in mind that all types of equipment offered by the material handling industry can be profitably employed. *It is a question of correct application.* For example, hand trucks have a place in all industrial truck operations. But instead of being the only medium of movement, they are supplemental to the powered equipment, serving for short and special trips and rearrangement. The tractor-trailer train moving multiple loads also fills a very important need by replacing trucks on long hauls.

Note: Substantial bridge plates should be used whenever powered equipment enters freight cars, providing essential safety.



**THE TRUCK AND THE LOCOMOTIVE**—Crane trucks like this one play an important part in ministering to "sick" locomotives in railroad roundhouses. Here a 3,000-lb. capacity crane truck is shown removing a side rod. Note that the truck's auxiliary boom is being used for the job.—Electric Industrial Truck Assoc.

# "On-the-Job" Charging

...AT TRUCK CROSSROADS



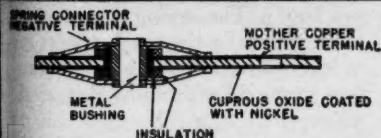
## THE WESTINGHOUSE RECTOX KEEPS 'EM ROLLING

Keep your industrial trucks rolling with a unit Rectox battery-charging station located "on-the-job" where the truck pulls in for parking. It takes the truck operator a matter of seconds to attach the charger cable to his battery, turn the Rectox time switch... then forget it. Batteries properly charged, regularly charged, are always in top form; and Rectox eliminates the unproductive truck run to the main charging station and back.

Rectox is foolproof. It handles rates of charge, timing, blocking of "flow-back" or leakage from the battery automatically. High, full-load efficiency is maintained to as low as 25% of full load. For that reason its economy of operation is excellent.

Streamlined plant traffic operation is a natural, with Rectox unit charging stations moved "on-the-job"...the exact spot, where regular, foolproof charging is needed. More than sixteen years of successful service assure the dependable operation of Rectox Battery Chargers. For complete information, call your nearest Westinghouse office or write WESTINGHOUSE ELECTRIC CORPORATION, P. O. Box 868, Pittsburgh 30, Pa.

J-21357



CROSS SECTION OF "RECTOX" PLATE

These processed copper-oxide discs are assembled on an insulated bolt with lead washers (for low contact resistance), spacers and cooling fins.



**Westinghouse**  
PLANTS IN 25 CITIES... OFFICES EVERYWHERE

*Rectox* INDUSTRIAL BATTERY CHARGERS





# ATTENTION...



Empty kegs, above, are loaded into specially constructed cage which accommodates 48.

Below: Twelve kegs weighing 200 lbs. each are moved at one time from production line.



BY C. E. CHAPMAN

Superintendent of Bolt and Rivet, Splice Bar and Tie Plate Departments,  
Inland Steel Company, Inland Harbor, Indiana.

**More men can now produce—because a fork truck handles both full and empty kegs by means of special steel pallets and keg cages.**

**T**HE handling of kegs has always been a problem, and the one that recently developed in the bolt and rivet department of our company is a typical one. It concerned the handling of kegs used for shipping spikes and bolts. By our original method of hand trucking the kegs could not be moved sufficiently fast, or in sufficient quantity, from the production line to the warehouse and then to the freight cars for loading.

After we had decided to transport the kegs by fork truck, another problem had to be solved. This concerned the design of a special skid plate or pallet which would accommodate 12 kegs weighing 200 lbs. each. This pallet had to be of the proper size for passing through any freight car door.

The models shown in these columns measure 45" x 55" and answered the need. Because of the weight of the kegs, these pallets were constructed of  $\frac{5}{16}$ " thick 4-way floor plate. The four I-beams on the underside were arranged for convenient entry by the fork truck. The weight of the individual pallet is 400 lbs., and enough were constructed to provide an ample supply for all needs.

In January of 1945 we placed the first fork truck in service. (Capacity, 4,000 lbs.; speed, seven miles per hour.) The saving in time and effort shown by the truck operation quickly proved this to be a satisfactory method for handling this product.

So far, however, the truck handled only full kegs. In order to provide the packers with a constant supply, we soon decided to have it transport the empty kegs as well. This problem was solved with our design of a special cage having a capacity of 48 kegs (weighing  $9\frac{1}{2}$



# "KEG-LEERS"!



Left: Use of cage makes possible transportation of large units of empty keels, aiding production. Below: Note storage and tiering of full keels five layers high. This saves floor area as well as truck travel.



Closeup of special skid plates in storage, below. Each weight, empty, 400 lbs., supports a load of 400 lbs., and has four l-beams.

lbs. each). One of the photos shows the cage being loaded with empties in the warehouse. It is picked up by the fork truck on its return trip from delivering a load of full keels, thus completing an economical circuit with no time lost.

The complete cycle is as follows:

The truck operator places the empty skid or pallet near the production machine. The full keels are placed on it four across and three rows deep. After the nailers have sealed the keels, the fork truck moves the whole load, whose gross weight is 2,800 lbs. The 12 keels reach their destination—either in the freight car or warehouse—in a matter of minutes.

When the loads are put in storage, the fork truck stacks them five tiers high. This ceiling-high stacking not only saves thousands of feet of floor space but also many miles of truck travel.

With our present method, many tons of the product are handled daily. One fork truck averages 154 trips per 8-hour day, carrying 1,848 full keels or 369,000 lbs. of useful load. This has eliminated back-breaking labor and has helped

speed our production, saving our valuable men for productive jobs.

In this way we at Inland Steel have solved our keel handling problem. The solution has been so successful that we are glad to pass on this information for possible use by other manufacturers.



# ON THE



# PALLET

## NEWS VIEWS TRENDS

**T**HE postwar world has been, it seems to us, fairly well popularized along the lines of developments in food, clothing and shelter. The Sunday Supplement scientists would have us wearing some variations of coal and air; the dream houses of the future will be put up in something less than a day—all complete, including bar, servants' quarters, indoor horticultural departments, etc., etc., for less than \$3,000.00. In the food marts of tomorrow we shall simply press a button and some sort of refrigerated mess will be on the table, super-electronically prepared in jig-saw time. Maybe so! But, there's a lot of work yet to be done in all of these fields.

By the way of improving the possibilities, the Wire-bound Box Manufacturers Association has just completed a 90 day test on flying all types of California fruits and vegetables to Eastern states through the medium of supercargo planes. The cost has been reduced from 26c to 15c per pound for the 2,000 mile flight, but most significant (of course) has been the improved methods in loading, reductions in crate weight and other miscellaneous realistic approaches to the matter of flow in proving conclusively that a very large and well developed market for sun ripened fruit will be made available to housewives all over the country.

The weight of crates for such perishables has been reduced by as much as  $\frac{1}{2}$  to  $\frac{1}{3}$  of the original surface-borne type of containers. For example, an air celery wirebound crate has been developed which weighs 2 lbs. 10 oz., where a comparable standard crate weighs 5 lbs. 8 oz. Asparagus wirebound containers were reduced to  $2\frac{1}{2}$  lbs. from  $4\frac{1}{2}$  lbs. Even beyond the matter of savings to the shipper, the implications insofar as the changes that must come in handling all volume goods of this nature in order to distribute the bounties of the earth more equitably are astounding.

**T**HE Navy's peak daily carloading of 5,035 cars was reached on August 12, 1945. This approximated 150,000 cars per month. During June, July and August 1945, the Navy shipped overseas 2,435,000 long tons. Its average monthly air cargo was 14,000,000 lbs. of materials besides 8,000,000 lbs. of mail.

With a continually dwindling supply of labor while the tremendous task of moving supplies was steadily increasing, the Navy drew on industry for the best obtainable talent and the most modern equipment for handling and storing the vast variety of products under every conceivable condition.

Standardization of types of equipment and methods with a complete educational program involving every

known means of visual aid enabled the Field Operations Branch of the Bureau of Supplies & Accounts to wage a successful campaign in gaining speed even though the supply lines were 5,000 to 7,000 miles—the longest in naval history.

Palletization, (which our reader knows means utilizing a wooden pallet 48" x 48" and approximately 6" high to combine for example, 40 to 60 small packages into one unit for handling and tiering in storage instead of handling each small package over and over again when each rehandling was necessary) did more to save precious manhours and effort than all other improvements combined. In addition, effective use of storage space was increased 300 to 500 per cent, carload tonnages and utilization increased tremendously with noticeable reductions in damage due to less handling. A well coordinated packaging program to fit the new handling techniques further contributed protection in the many movements from the source, the contractors' plants to the point of consumption.

**I**N MOVING canned provisions in palletized loads on trucks and trailers as much as 96% of the usual back-breaking manhours was saved by the Armed Forces. Palletized unit load movements by rail showed an increase of tons moved per manhour from 2.5 tons to 11.1 tons per manhour. In the loading of many ships, tonnages were actually increased  $2\frac{1}{2}$  times that obtained by the former method using the same sized stevedoring gangs.

While ordinary commercial operations do not equal the ideal condition of volume and carload movements of the Services, substantial savings can be made at once in many phases of material handling by the use of pallets with either powered fork trucks or hand pallet lift trucks. Conveyors, cranes with bar slings, and other supplementary equipment play their part in these modern operations.

Movements by rail and ship of palletized unit loads, either strapped or glued, are gradually being used commercially. These practices will increase as studies of specific situations reveal actual economies. It is safe to say that any concern involved in handling or storing any product that either occupies more than negligible space or weighs as little as a Dixie or Tulip Cup can benefit by palletization.

Since the war, equipment required in handling unit loads has been limited but it is now becoming available to all users. Indications are that any surplus of this equipment will be relatively small. It will be confined largely to activities involving almost obsolete methods of handling, due to the continuing large overseas shipments, wartime abuse, and the desire of all agencies to retain only the most modern equipment.

# Prescription for Better Product Protection

*Doc Steelstrap\**

**R**

Reinforce individual shipping packs, skids and pallet loads with Acme Steelstrap\* . . . brace carload shipments with Acme Unit-Load Band\*

\*Reg. U.S. Pat. Off.

Simple and efficient, Acme Products, and the tools with which to apply them, have met almost every conceivable test of strength and durability since the start of the century. Today when deliveries of undamaged products build

goodwill and invite repeat orders, your products need the protection of Doc Steelstrap's formula.

There's a factory trained Acme Packing and Shipping Engineer in your vicinity; a letter from you will bring him to your door.

New York 17

Atlanta

Chicago 8

Los Angeles 11

**ACME STEEL COMPANY**

ACME STEEL CO.  
CHICAGO

DECEMBER, 1945

29



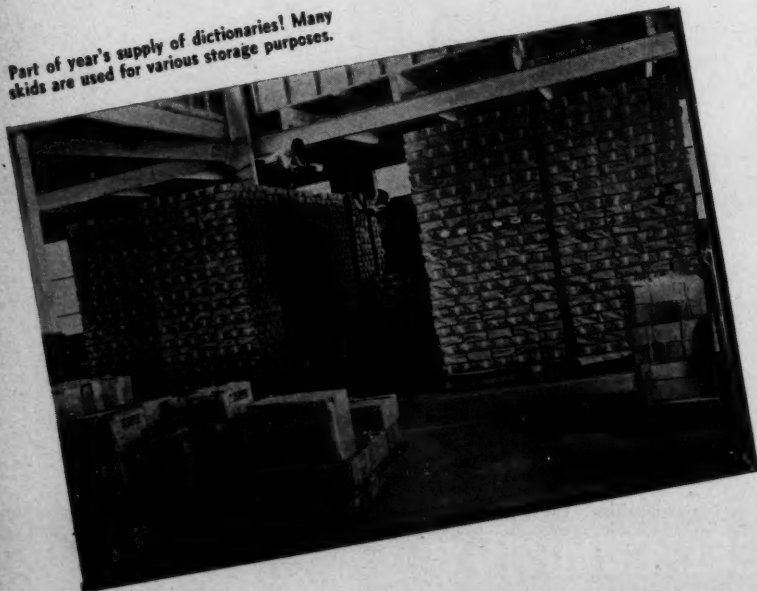
Photo at right shows sections of gravity wheel conveyor installed conveniently near stock bins. Note metal pans.



# A Moving

*Fractions of cents in per unit costs make the difference between profit and loss . . . This installation for order picking, packing and shipping reduced former handlings by more than 50% . . . cleared one-third of the warehouse floor area.*

Part of year's supply of dictionaries! Many skids are used for various storage purposes.



**E**NGINEERING skill is usually focused on moving the work to and from the machines in the production or assembly department, while the handling of the finished product in the warehouse very often may be done according to the methods of 20 years ago.

Not so at The World Publishing Company—one of the country's largest book publishers. A fraction of a cent in the cost per unit of low-priced books may mean the difference between profit and loss on a large printing run involving hundreds of thousands of units. Because of up-to-date material handling methods in the company's order picking, packing and shipping operations, important "fractions of a cent" are saved that add dollars on the profit side of the company's ledger.

## Accessibility the Key

A continuous line of gravity wheel conveyor is installed alongside stock bins for easy accessibility by order clerks, as shown in the accompanying layout sketch. The

**FLOW**





Rear view of stock bin locations, left. Feeding of bins from this side does not interfere with order picking from front.

# Story...

550-ft. conveyor line consists of standard 5-ft. and 10-ft. sections and three power belt units. About 90% of orders are handled on this installation, while the remaining 10%, consisting of larger orders, are assembled and moved on skids. The smaller orders represent a daily outgoing volume of 1,500 shipping cartons with an aggregate weight of about 45,000 lbs.

The stock is brought on wooden skids by over-the-road truck from the printing and binding department across the street to the 28,000 sq. ft. warehouse. The loaded skids are moved by hand lift truck to either of two types of storage areas.

1. Permanent storage for large-volume goods—a year's supply of dictionaries, for example—is in two bays to the south and west of the stock bin locations. 2. Temporary storage for current orders is provided in aisles that are located between and to the rear of the stock bins. This permits the bins to be fed from the back, without interfering with the stock picking operations performed from the front.

As the orders are picked they are

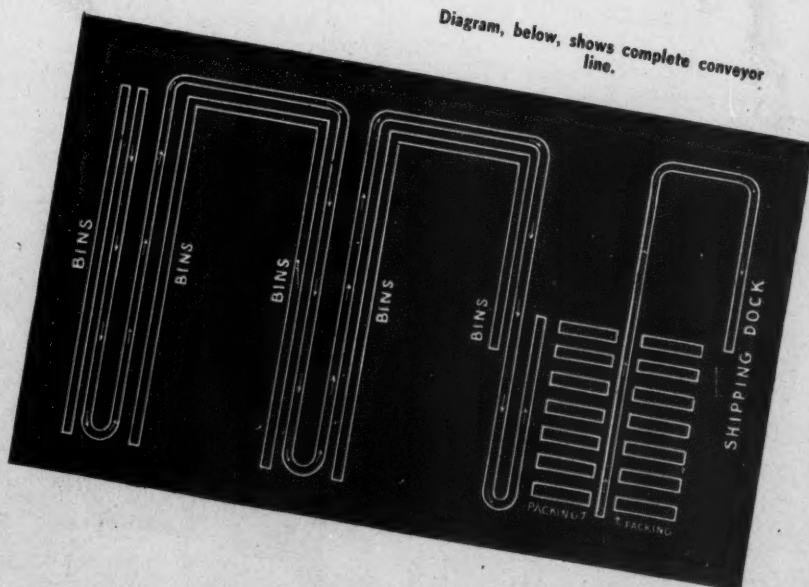
placed into 18" x 24" metal trays, which the stock clerks push along with one hand on the conveyor line as they move from bin to bin. Because frequent stops are made at short intervals, the non-powered conveyor is well suited to the purpose. The maximum weight of

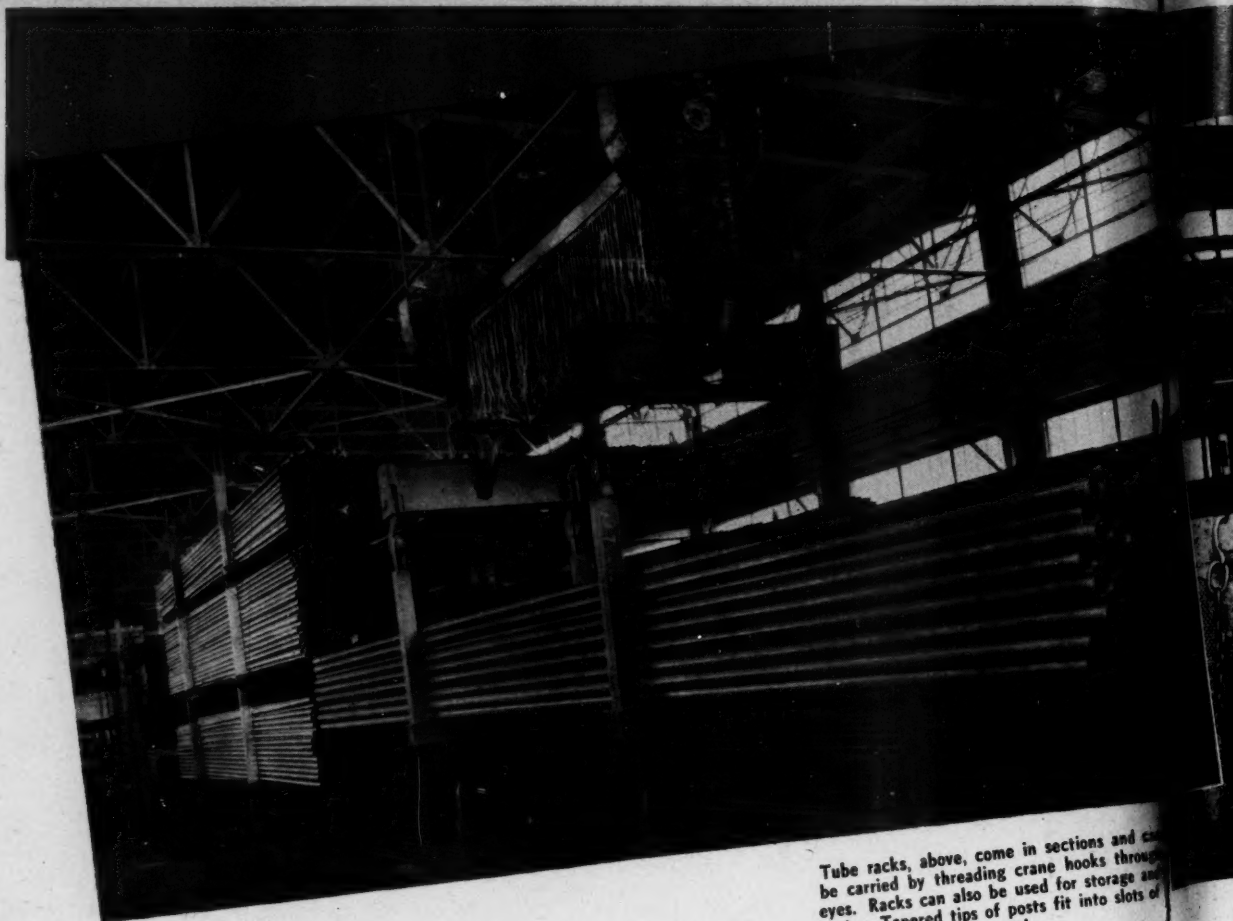
books lifted by the clerks at any one time does not exceed five lbs.

As can be seen from the layout sketch, the end of the order picking line is parallel to the packing tables, the two separated by a narrow aisle. A male operator transfers the loaded trays to one of the 11 packing tables, which are also standard

(Continued on page 45)

Diagram, below, shows complete conveyor line.





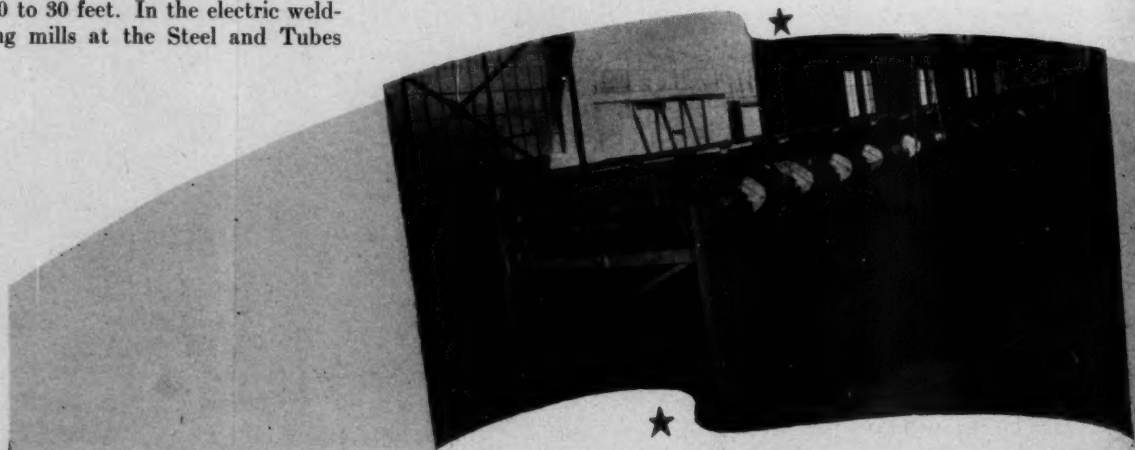
Tube racks, above, come in sections and can be carried by threading crane hooks through eyes. Racks can also be used for storage and tiering. Tapered tips of posts fit into slots of upper rack.

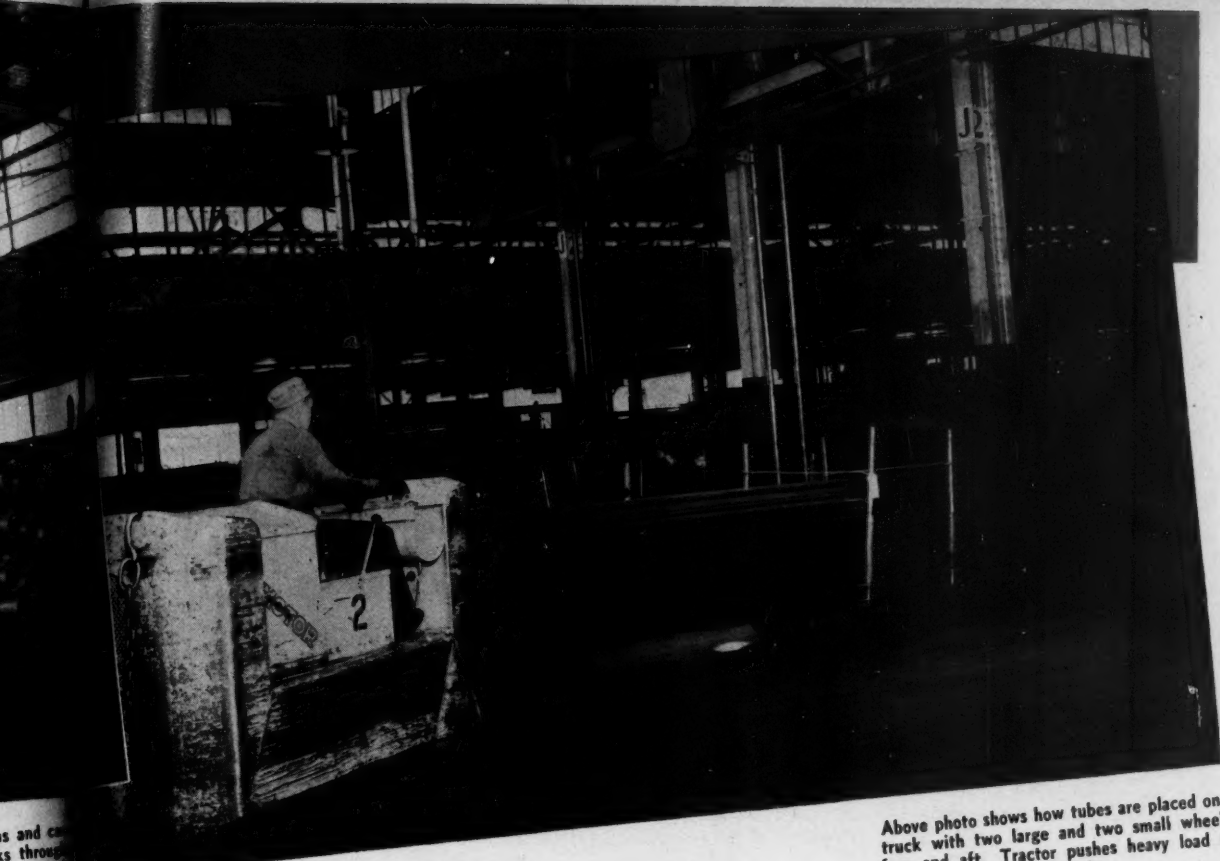
## A Pipe Dream Come True

**I**T TAXES the imagination to look at a stockpile of coiled steel and to visualize that in one operation these coils will emerge in the form of long heavy tubes which are cut in lengths of 20 to 30 feet. In the electric welding mills at the Steel and Tubes

Division of Republic Steel Corporation, Cleveland, the stock is formed by rollers, welded, freed of beads and cut to length in one continuous operation. The movement of ma-

terial through these machines makes for easy processing, and the amount of materials handling saved by proper grouping of processes is often overlooked.





Above photo shows how tubes are placed on a truck with two large and two small wheels, fore and aft. Tractor pushes heavy load to next operation.

### ***Production and Stock Piles Soar with the Aid of Overhead Traveling Cranes, Special Portable Racks***

And the ease with which these long and heavy tubes are transported throughout the shop tends to make one overlook the amount of planning done to bring about this

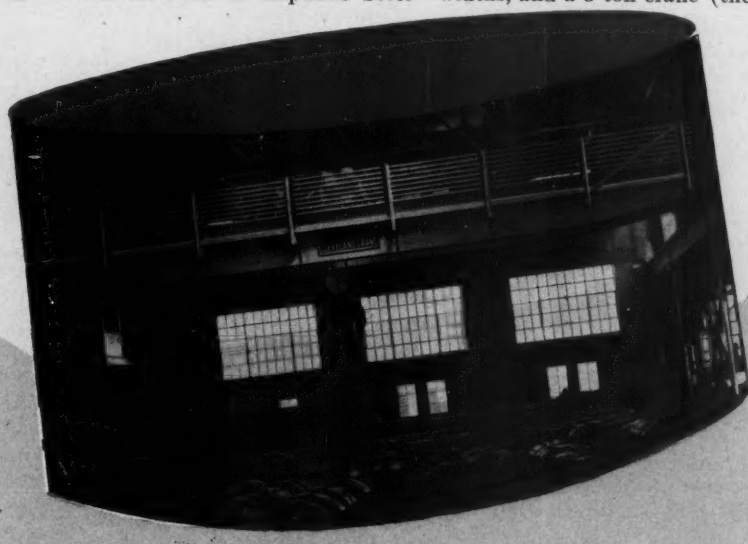
smooth flow of tons and tons of material.

The installation of overhead traveling cranes at the Steel and Tubes Division of Republic Steel

Corporation had to be coordinated with other handling aids to bring about the present satisfactory flow.

#### ***Cranes Store Raw Materials***

In the storage area for coils of strip steel there is a 10-ton crane for handling the larger widths of strip, a 5-ton crane for the smaller widths, and a 3-ton crane (the lat-



Left: Tube bucks receive tubes at discharge from furnace. Right: Coil storage is served by 10-ton, cab-controlled crane with 65-ft. span. It also moves coils to tubing line.



Above view of boiler tube room shows sectionalized racks, inclined table, 10-ton crane. Note that a planned material handling program provides maximum use of area, neat housekeeping.

ter pendant controlled). The bulk of the handling is done by the 10-ton and 5-ton cranes, each serving a particular section. The span of each is approximately 70 feet. If material in one bay is to be transferred to the other, a carrier on rollers on the floor moves the lift a few feet from beneath one span to the other.

This easy movement of material through the bays is further aided by the storage layout. An aisle through the center for highway trucks permits incoming coils to be unloaded by either of the two cranes, which remove 7 to 10 coils in one lift. Tubular racks set on the floor receive the coils from the cranes and hold them in position to make a firm and steady bottom row. Other rows are set on top. (All coils of steel come in from the supplier in lifts of from 7 to 10 coils.) Each of the different sizes is stored behind those electric resistance welding mills most likely to use that size.

The 3-ton hoist removes the smaller size coils from the stockpile to a transfer truck set in channel tracks. This truck is pushed a few feet to the welding mill. Larger size coils are rolled by hand a few feet to the larger welding mills.

#### Pushed to Span of Cranes

As the stock emerges from the welding mills it is transported on live rollers until the end hits a stop and the tube is automatically cut off to length. The tubes are then

placed on a four-wheel tilting truck, and the load is pushed by a tractor to straightening or annealing locations.

In the mechanical finishing department, a 10-ton crane with a span of 58 feet moves work in process throughout that area. In the boiler tube room are two 10-ton cranes with a span of 80 feet which service that area. All these cranes are cab-controlled and have a lifting beam with two or three hooks. After transfer of long lengths of tubes from welding mills by truck beneath the span of one of these cranes, the load is removed by means of two braided wire rope slings through which are threaded the hooks on the lifting beam of the crane.

#### Handling Tubes At Work Stations

Inclined tables are used extensively throughout the shop. The lift is received from the crane and the tubes are rolled one by one onto live rollers which feed the machines or furnaces. At the discharge end



The transporting and weighing of material are one operation on this modern, mobile scale.



Industrial tire trucks can be preserved more adequately by avoiding excessive heat areas. The operation or storing of rubber tired equipment where there is more than the ordinary amount of heat causes the breaking down of the tire structure. Partial protection can be obtained by placing a metal heat shield over such tires. However, the equipment should be kept away from oven rooms, furnace or chip departments, or other places where there is excessive heat.

these tables feed the work by gravity into tube bucks on the floor. These tube bucks hold the work above the floor and make for easy rehandling. Note the cable returns which are now put inside the bucks. This gadget makes the crane follower's job easier by eliminating the trouble in locating the sling or chain under a load.

#### Tube Racks and Spacing

Storage racks come in sections which by proper spacing enable an entire lift to be securely racked upon release from the sling. The loaded section of rack can be moved by crane, as shown in one of the photos. The tube storage area is planned and the racks are set into definite areas marked on the floor. This spacing is important because on the bridge of the crane is set up



Steel coil storage: A noteworthy handling aid is this pit in which are stored the hairpin hooks used by the crane. Hooks remain in an upright position in this specially constructed pit, permitting easy threading on crane gear.

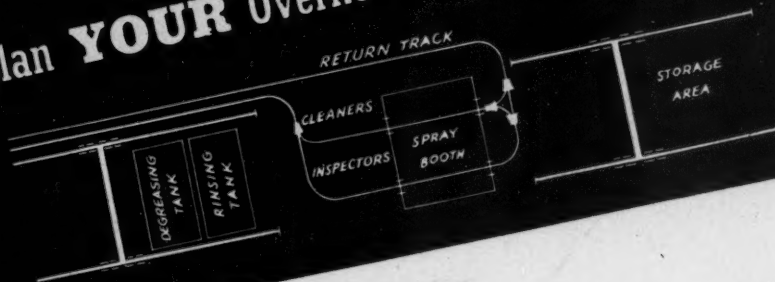
a corresponding measurement. Along the bridge are electrical contact points which enable the crane operator to regulate the trolley so that the lift is on dead center with the racks below.

(Continued on page 57)



LET A SKILLED

plan **YOUR** Overhead Handling System



American MonoRail Engineers, with their highly specialized experience, can relieve you of all details in cranes and overhead handling systems. They are constantly in touch with handling problems of every conceivable kind. At the beginning of the project their assistance in preparing an accurate and efficient layout will insure successful operation of the system.



Let us send you a copy of our 264-page engineering manual covering Mono-Rail Carriers and Cranes.

These engineers are conveniently located in nearly every industrial center for immediate consultation. This service is gladly offered without obligation.



THE AMERICAN **MONORAIL** COMPANY

13129 ATHENS AVE.

CLEVELAND 7, OHIO

DECEMBER, 1945

35

# BRIGHT ON TIME

*This institutional laundry is geared to process 100,000 pieces, or 50 tons, daily. Here's how it's done.*

BY D. H. FITZGERALD,

Laundry Manager, The Pullman Company Chicago Laundry

**A**S YOU snuggle down in your Pullman berth between smooth sheets, or enjoy the bright napery in the cafe car, you may or may not wonder about the laundry that helps provide these hotel comforts on your trip. The job—and it's a big one—could not possibly be done without the aid of modern material handling methods and equipment.

The Pullman Company operates ten laundries located at strategic points throughout the country, processing millions of pieces that



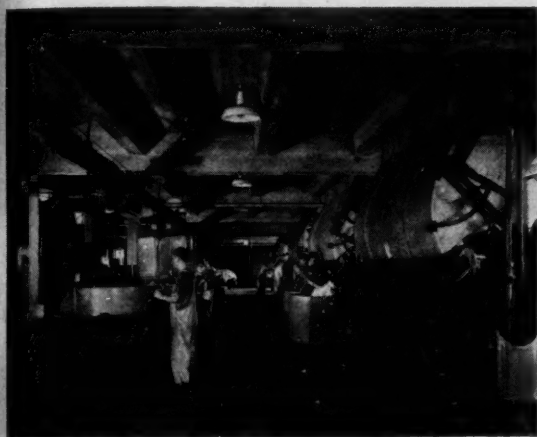
Top: Three-wheel truck with stake body hauls trailer load of soiled linens from car. Small photo, left: Bags are dropped on conveyor running under truck dock. Note guard rail at height of man's chest. Large photo: Hopper's being loaded on second floor. Capacity of each section equals that of washed pocket.

total many thousands of tons annually. This tonnage must be reconditioned and returned to the coach yards on fast schedules. While there are some operational differences in detail between the various laundries of our company, the flow and handling methods of the Chicago laundry, described here, will give material handling

opened and closed by an air control button from the washroom. This arrangement allows the washmen on the ground floor to unload the bins successively, starting from the bottom.

After laundering, the work is loaded into caster-mounted extractor baskets, which are equipped with drop bottoms. The full bas-

fairly simple twofold breakdown, it may be noted in passing, is possible only in an institutional or industrial laundry where large quantities of like items are handled on a mass production basis. In a commercial laundry, on the other hand, separations must not only be made between each individual family bundle but also between the vari-



Above: Centrifugal extractors, left; washers, right. Spotted over Pre-dried short work is dropped through bottom of extractor basket washers are chutes leading from soiled linen room on second floor. into receptacle, from which work is carried to overhead tumbler.

engineers an idea of the procedures that prevail generally.

### Going to the Laundry

At the end of each trip, the bags of soiled linens (counted and classified) are brought by tractor-train from the cars to the linen store rooms at the coach yards. Over-the-road trucks then deliver the work to the laundry.

As the bags are unloaded at the plant, they are dropped on a flight conveyor, which is installed in a pit under the truck dock. This conveyor delivers the bags to the soiled work (or classifying) room on the second floor. Rubber-tired hand trucks are used for transferring the bundles to the soiled linen hoppers—gravity chutes which lead to the washers on the floor below.

These hoppers are divided into bins, the capacity of each bin being equivalent to the capacity of a washer pocket or compartment. As can be seen from one of the photos, the hoppers are constructed in three tiers of four bins each, one tier above the other, the twelve bins corresponding to the number of pockets in a washer. Each bin has a hinged bottom, which is

kets are rolled over to an extractor, where they are set (in pairs) by an overhead electric hoist into the centrifugal machine. By means of the electric hoist, running on a monorail, the extracted work is then moved to the desired location.

The flow diagram illustrates how, after laundering and extracting, the short work (pillow slips, hand towels, napkins, etc.) is routed east, while the sheets and other large pieces are sent to the west end of the finishing department. This

ous fabric and color classification contained in each bundle.

### Handling Short Work

After extracting, the short work is dropped through the bottoms of the extractor baskets into a stainless metal receptacle. From here, these pieces (somewhat wadded from the centrifugal pre-drying) are fed by means of a cleated conveyor into an overhead conditioning tumbler, as shown in one of the photos. The tumbled (loosened up) pieces drop through the open end of the revolving tumbler into the caster-mounted box trucks shown. The latter are then pushed to one of the flatwork ironers. Here the work is placed on a feed-on conveyor that delivers the damp linens to a conveyor belt running the width of the feeding end of the ironer. In this way the feeders have a constant supply of work literally at their finger tips as they sit before the machine, eliminating any turning or walking on their part.

"Why don't you route the short work directly from the overhead conditioning tumbler by conveyor to the feed-on line serving the ironers?" This question is usually



Looking down the clean linen conveyor. Folding stations are located at its left.



asked by visitors to our plant. The fact is, we tried this method and gave it up. Here's why. In the interest of mass production methods, all work of one type must be run through the ironers at one time. And since a number of classifications of different sizes are involved (napkins, towels, etc.), it is better practice to keep each group separate by use of the box trucks. In this way the necessary separations are easily maintained. Solid loads of one kind of work can thus be fed into the ironers, and extra sorting of the pieces is avoided.

The ironed work is deposited in neatly piled stacks by automatic stackers at the delivery end of the short work ironers. These stacks are removed periodically and placed on caster-mounted tables, which are wheeled to the short work folding tables. The uniform stacks of folded linens are placed by the folders on the nearby clean linen conveyor. The latter delivers the work to the bundle tying and packing operations.

#### Moving the Sheets

These larger pieces are unloaded from the "dump type" extractor baskets directly into the box trucks, with no intervening tumbling. The sheets are prepared for the ironing



Bundle tying operators at end of clean linen conveyor. Bagger is shown at left of table.

operation by shaking operators (shakers), who lay out these linens flat in a double fold on caster-mounted tables, as shown, with the two corners of each top half turned up. (The turned-up corners serve as convenient "handles" when the feeders pick up the sheets.) By placing these linens flat, instead of hanging them over poles (the practice in many laundries), it is unnecessary for the feeders to "steer" each sheet through the ironer. As soon as a sheet has been fed into the ironer, its smooth and even position permits the operators to reach immediately for the next one.

At the delivery end, the iron sheets pass through a mechanical folder, which makes two folds the long way and drops the sheets on

stainless metal folding tables. The operators make the two short folds and, as in the case of the short work, then place the sheets in uniform stacks on the clean linen conveyor, conveniently within reach.

Why are the sheets folded at the ironers while the short work, delivered in flat stacks, is placed on tables which are then wheeled to a separate folding station? The answer is simple. The smaller items come off the ironers in such large quantity that the machines would have to be slowed down in order to allow operators to keep up with the folding. By folding this work at a separate station, efficient machine-hour production can be maintained on the short work ironers.

(Note: Since blankets are processed in a separate department, which is exceptionally compact, the manual handling of this operation is not detailed here.)

#### Back to the Trains

One of the photos shows the stacks of finished work moving out on the clean linen conveyor. The bundle tying operators and packers are stationed at its end. (This belt line, about 200 feet long, runs parallel to all folders as well as the bundle tiers.) Each of the tying operators has within reach a stop and start switch, which controls the movement of the belt.

Since the conveyor, the bundle tying machine, and the packing tables are all on the same level, the work is handled easily by sliding it from operation to operation. The tying of the stacks is simplified and speeded considerably by use of tying machines. The packers take the tied stacks off the tables and place them in standard units in the freshly laundered car bags.

A specially constructed bag-folding rack, mounted on casters, is used. The bags are held in position by the extended spreader arm of the rack, permitting the operator to use both hands for packing. When the bag is full, the collapsible spreader arm is pushed back, releasing the bag. It is then tied and wheeled over to the nearby clean linen storage area. Here, shovel-type hand trucks pick up three or four bags at a time for transfer to the loading dock.

In this way millions of pieces are

Section of finishing room: The sheets are laid out flat (in a double fold) on caster-mounted tables, center, and are then wheeled over to feeders who are shown at flatwork ironers, left.





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handled in our laundry annually—without backtracking and with the least possible handling, and on a schedule that provides a clean suite of linens for every outgoing train.

I wish you a pleasant trip.

### 10 RULES FOR SAFE SHIPPING

**L**ISTED below are 10 rules developed by W. C. Johnson, Freight Claim Agent of the Chicago and North Western Railway Co., for users of rail facilities. They are designed to help you prepare goods for safe movement in transit. Their application has saved many a shipper, as well as receiver, delays and disappointment. Mr. Johnson has been active for several decades in freight damage and loss prevention work.

1. Use the most suitable containers available; when in doubt reinforce these by any method that will help take up shock and wear.

2. Make certain your freight is clearly and correctly marked, and that shipping tags are durable and securely fastened.

3. Be sure to remove all old shipping instructions, tags and labels on re-used containers.

4. In stowing and loading freight, distribute and level the load properly, using blocks, bulkheads, or bracing where necessary.

5. Use proper packing materials in your containers which may not be strong enough to protect your product.

6. Open containers carefully to avoid damage to contents.

7. Take note of the condition of the freight in a car or container to determine how it can be loaded or packed better the next time. The shipper will be grateful for your ideas.

8. If freight is damaged, try to determine the cause and who contributed to it. Remember, the shipper and carrier can see the condition of the product at destination only through the eyes of the receiver.

9. Unload cars immediately. Be sure to remove all dunnage and debris. This will make cars available for other shippers quickly.

10. Don't assume that damage is unavoidable. Both the shipper and the carrier want to satisfy; they can do this only by cooperation and suggestions from the receiver.



**REMOVING SCRAP**—This fork truck is equipped for handling scrap. The rotary attachment is shown discharging baled steel scrap into a freight car. A sizable weight is handled on each trip. Courtesy, Electric Industrial Truck Association.

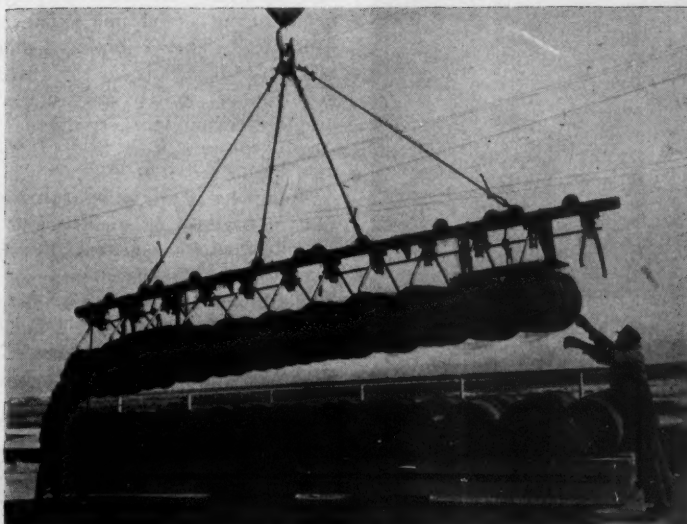


Figure 1—A 12-ton holder in operation (note that the second tier has one less than the bottom number.) The third and final tier will have one less drum than the second tier.

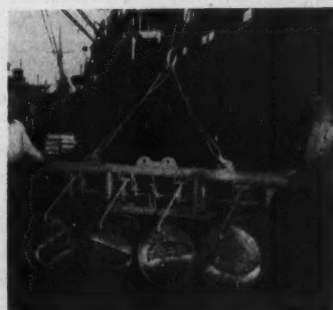
### DRUMS AWAY

**H**EAVY oil and gas drum shipments on the West Coast called for resourcefulness to speed up literally mountains of drums containing fuel. By use of automatic grip drum holders the operation is made simple, safe and speedy. When the batten rests upon the bilge of the drums the fingers are raised, and when the crane hook raises the bridle the fingers grip all of the drums.

The straddle truck is efficient for long hauls and makes possible a well coordinated operation without tying up any powered equipment.

The four drum bridle finds ready acceptance in ship loading.

Figure 2—Closeup of a 4-drum holder. Re-handling is eliminated by this method.

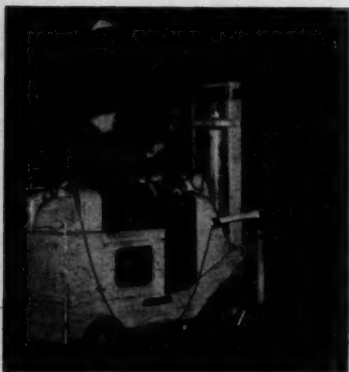




## A WIDESPREAD SMALL FOUNDRY PROBLEM

This problem concerns the handling of sand in a foundry. Hundreds of tons of it have to be transported weekly from the muller to the various molding stations.

During the war, heavy production demands made it impractical



Truck loads bucket by holding it under muller. This involves minimum handling.

to haul sand by wheelbarrow to the smaller operations where not so much sand was required. Increased production also added much to the duties of the overhead traveling cranes, and as a result they were not available to haul sand to the operations not accessible to the wheelbarrow.

Go up in the air with an overhead conveying system? In this particular foundry such an installation was not advisable, according to the management, for two main reasons. 1. The plant consists of three adjoining buildings, with three different roof heights. 2. In some areas the headroom is rather low. Thus any overhead means of conveyance would have required extensive building changes.

Since 15 sand hoppers are located at various stations throughout the shop—some at a distance of 200 feet from the muller—a very flex-

ible means of conveyance was necessary.

This was the problem faced several years ago by the Kensington Steel Company, Chicago, manufacturer of manganese steel wearing parts used in a variety of pulverizer, crusher and heavy-duty material handling equipment. Manual handling of sand had been in use when the shop was smaller some years ago, but mechanization of this operation became an urgent need during a wartime expansion program. (The company made 800,000 tank treads for the British government, to cite only one example of expanded activities.)

### What to Do?

Following a study by the company's engineering department, it was decided to transport the sand by means of a fork truck—with this difference: the truck's hoisting equipment would operate a bucket instead of forks. The company then designed the special bucket shown



1,000 pounds of sand going to molding station—an efficient speedy method.

in these photos. Its capacity is approximately 1,100 lbs.

The truck operator loads the bucket simply by positioning it under the muller, as shown. In a few minutes it is loaded, and on its way to any of the several hoppers. At the designated locations the more than half-ton loads are hoisted and discharged in a jiffy, and presently the truck is back at the muller getting another load. The fleet truck makes approximately 150 runs daily, hauling between 75 and 85 tons of sand.

Power handling by truck and bucket has relieved the crane as a part-time sand handler, which used to be both a laborious and costly operation. (Today it handles the sand for only one operation, which is inaccessible by any other means.) Many shop improvements resulted.

Load is hoisted and discharged in a jiffy at station—and truck is ready for another run.



## CARLOADING

**A**S a preliminary to the course in carloading the students who have been selected for these lessons should be conducted to a location where a loading or unloading operation employing the best available truck operators is in progress so that they may observe the procedure first hand. The period allotted for observation should be sufficient for the students to see at least half of a car unloaded. Their attention should be directed to the bridge plate used and the method of securing and moving the plate should be explained.

For practice in operation, a car doorway, bridge plate and car wall should be marked out in the practice area by means of pallets. The students should demonstrate their ability to drive in and out of a car in the practice area before proceeding to an actual freight car. After they have proved that they are capable, they should be taken to some location where they can drive in and out of an empty car with no load except an empty pallet.

### Placing Pallets

Following this practice the class should be taught the placement of 48" x 48" pallets for unit load shipment in a standard box car floor layout marked on the practice area floor. Actual pallet loads of unbreakable goods should be used if possible and a half car should be worked two tiers high in the practice area. After the student has demonstrated his ability to unload a car on the practice floor he should unload merchandise from car in a fairly "quiet" location under the supervision of a trained operator.

Instruction in carloading should include the following points:

1. Make sure the car plate between the car and the unloading platform cannot slip or slide. It should be securely fastened so no accident can happen. This is a safety **MUST**.
2. In entering or leaving the car, the fork truck operator should drive the truck over the car plate slowly and carefully—especially when loading. Fast operation at this point tends to cause accidents and damage. A fork truck with two or more speeds should always be



operated in low speed, when driving in or out of the box car with a load. By keeping the trucks in low speed, it will reduce the possibility of the operator slipping and wearing out the clutch in the case of gasoline operated trucks, and it will make for smoother operation on all types of trucks.

3. It is advisable to have the operator drive the truck forward into the car, then turn to the left or to the right as the case may be, to pick up the loaded pallet. **GO IN FORWARD—NOT BACKWARD.**

4. Freight cars are not always level with the unloading platform. Sometimes they are higher, and sometimes they are lower. This irregularity affects the method of loading and unloading with the fork lift truck. The following are considered good practices:

(a) When the freight car is level or higher than the platform, the operator should drive **FORWARD INTO THE CAR WITH HIS LOAD AND DRIVE IT OUT BACKWARDS IF POSSIBLE.**

(b) When the freight car is lower than the unloading platform the operator should **BACK IN WITH HIS LOAD, AND DRIVE IT OUT FORWARD.**

The reason for these suggestions is to always keep the load leaning against the back rest as much as possible. Otherwise, the load may easily shift out of line for stacking or the load may fall off and damage the commodity. If it is a heavy load, the truck may be upset.

5. When lifting a load inside the car with a gas truck always watch the channel uprights which rise with the lifting carriage. There is nothing quite so embarrassing as to discover that your channel uprights show when viewed from above the car roof.

6. When unloading loose containers the operation should begin by placing the pallet as near to the car door as possible with the stringers placed in the proper position so it can be easily picked up by the fork truck. Commodities are removed from the doorway first and palletized on the car floor. Again care should be exercised to see that the stringers are in the proper position so the pallet load can easily be picked up by the fork truck. Commodities are removed from the doorway first and palletized outside of the car. After sufficient containers have been removed, the remainder can be palletized on the car floor. Again care should be exercised to see that the stringers are in the proper position so the pallet load can easily be picked up by the fork truck. When the containers in the center section of the freight car have been removed, the laborers will work towards the ends of the car. Pallets can be loaded at each end of the car simultaneously. This, however, should only be done if the haul is short and one fork truck is sufficient to handle the pallet without delay. On such an operation the fork truck operator should take the pallets first from one end and then the other end alternately.

7. If the loads in the car have been shipped in palletized unit



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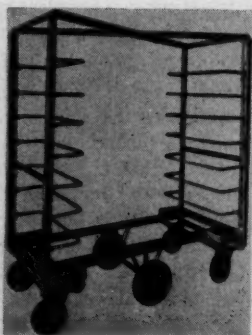
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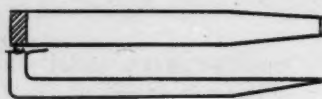
**TOWSLEY TRUCKS, INC.**  
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loads without loose contain-  
ers, the fork truck operator  
can work directly into the car,  
bringing out one load at a  
time. On this kind of an oper-  
ation it is sometimes possible

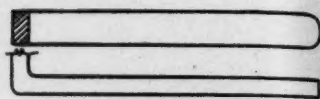
also to use two operators on  
the same car without interfer-  
ing with each other.

8. To load large cases into box  
cars that have been been ware-  
housed on short dunnage, the

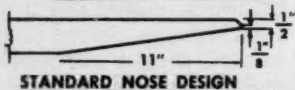
## HOW MANY FORK TYPES?



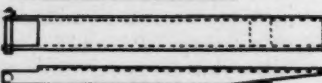
STANDARD PALLET FORKS



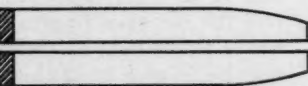
PALLET FORKS W/ROUND ENDS



STANDARD NOSE DESIGN



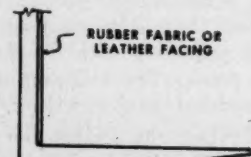
FORK EXTENSIONS



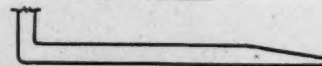
OPTIONAL ROUNDED CORNERS



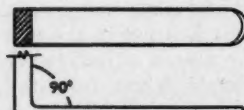
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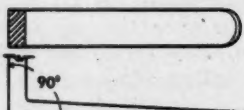
TINPLATE FORKS



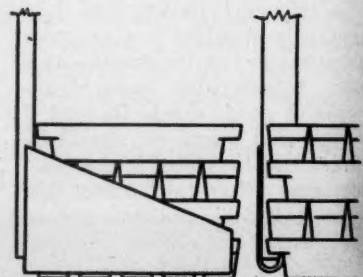
PAPER-ROLL FORKS



CHISEL POINT FORKS



PULP-HANDLING FORKS



PIG-HANDLING FORKS

Specially designed types of forks are available for handling various kinds of loads by fork lift trucks. The question as to how many types of forks there are is here answered with illustrations reproduced from a publication of the Electric Industrial Truck Association. Frequently a company provides several kinds of interchangeable forks for trucks, depending upon the nature of the various materials to be handled.

Usually a chisel fork is used for picking up loads not on pallets, according to the association's publication, though in some instances such loads are handled with regular pallet forks. However, it is advisable to handle each kind of load with the type of fork specially designed for it. Pulp, roll paper and tin plate forks are well-known examples. These are illustrated together with other types in the accompanying sketches.

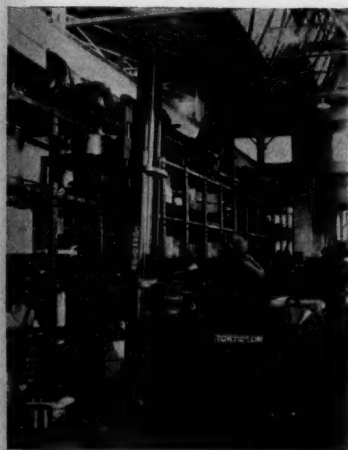
Their interchangeability, plus extensions for increasing the length of the regular forks, makes the modern fork truck a materials handling device of remarkable flexibility.



following is a suggested procedure: (NOTE: Only ONE helper is necessary.)

- (a) Drive the loaded truck into the car.
  - (b) Place the cases in the desired position.
  - (c) Set the cases down on a 2" x 4" to permit the forks to be withdrawn from under the case.
  - (d) The forks of the truck should then be withdrawn to within about 2" from the edge of the case.
  - (e) Lift slightly to withdraw the 2" x 4".
  - (f) Set the load on the floor and back the truck away.
9. To unload large cases from the box cars, reverse the operations. If large containers are to be placed in storage on short dunnage or spacers, they should be placed on short dunnage in the car, and stacked one or more cases in height as desired, depending upon the weight and size of the case.

**HIGH STACKING** solved a serious problem at the Gisholm Machine Co., Madison, Wis., plants when wartime production demands created a space shortage. High stacking of assembly parts by means of fork trucks utilized overhead storage space, making thou-



sands of additional square feet of floor space available for production. The company also uses its lift trucks for moving its materials between processes, loading and unloading a tempering furnace, for millwright work and moving box cars.—*Courtesy, Towmotor Corp.*

This will then permit the fork truck to pick it up easily in the car without additional handling.

### MORE TRAINING

The following questions and answers from the booklet "Inside Transportation Operator's Manual" issued by the Glenn L. Martin Company, is a recap of rules and regulations for inside truck drivers in that company's operations. These are presented here because we believe they are basic in any training program.

1. Does a pedestrian have the right of way?
  - A. Yes, at all times.
2. What are "safety zones"?
  - A. They are checkered areas painted on the floor, at locations where a pedestrian may step from an office, rest room, etc., into a trucking aisle.
3. Is it permissible to drive a truck through a safety zone?
  - A. No. Truck operators shall exercise special precautions to insure that they do not drive their truck through a safety zone at any time.
4. What about "stop" signs?
  - A. All aisle intersections should be approached with caution and the speed of the vehicle reduced. Where "stop" signs are located, all trucking must come to a complete stop before proceeding.
5. What is the rule regarding "riders"?
  - A. Truck operators shall not permit "riders" on their trucks with the exception of:
    - a. Helpers assigned by supervision (in which cases you will carry written permission for said helper and be responsible for him).
    - b. Trainees or instructor.
6. Should a sick or injured person be taken to the hospital on a truck?
  - A. No. Stretchers are provided for the transportation of these employees.
7. When following another

truck, how much distance should be maintained between the trucks?

- A. A distance of two truck lengths.
8. When should accidents to person or equipment be reported?
- A. Such accidents should be reported immediately to the supervisor.
9. Is speeding permitted?
- A. No. Reasonable and proper speed shall be maintained at all times. Reckless driving is prohibited.
10. How shall defects in the mechanism of a truck be reported?
- A. Defects in brakes, steering, horn, etc., on any truck shall be reported to the supervisor immediately.
11. What is the purpose of the Authorized Operator's Badge?
- A. The badge indicates that the driver is acquainted with the operation of his

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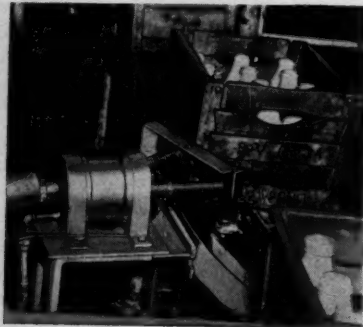
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Address .....

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## DIRECTS MILK TRAFFIC

**T**WO converging conveyor lines at Cleveland's Telling Belle Vernon Dairy carry cases of bottled milk to one line, which delivers them to the storage room. To permit cases to enter this line from either "A" or "B" conveyor, one at a time, a case stopper device has been installed on both lines near the converging point. Cases arriv-



ing on conveyor "A" bump the "stopper", which causes a rod to shoot across conveyor "B" and hold back any cases approaching the junction. When the cases on conveyor "A" have passed the stopper, the compressed air operated rod on line "B" is automatically withdrawn, opening the path for the waiting cases to the storage room.

truck and the rules governing its operation.

It further indicates that he has been tried and tested, and that he has proven himself a careful driver. No one may operate a truck without this badge.

12. What direction should the operator face when driving his truck?

A. He should face the direction of travel. When backing up he should change his position in order to still face the direction of travel.

13. What is the purpose of the horn?

A. The horn is a warning signal and should not be used to frighten people or as a substitute for the brake.

14. A truck is traveling along

the aisle and another truck is about to enter the aisle. What truck has the right of way?

A. The truck traveling along the aisle has the right of way. The operator entering the aisle should wait until he has a clear road ahead of him. Where main aisles intersect, the vehicle approaching from the right has the right of way.

15. Are there any parking regulations concerning trucks?

A. Yes. Trucks shall not be parked in the aisles or any place where they will present a hazard or interfere with normal pedestrian or truck traffic. Parking is also prohibited on railroad tracks or in such a position to block emergency equipment.

16. What is parking?

A. The stopping of a vehicle except to load or unload.

17. What precautions should be taken concerning the load to be carried?

A. Inspect the load you are about to move to determine if it is properly piled. If you are in doubt, do not move it.

18. What precautions should be taken when entering a freight car with a truck?

A. Observe the condition of the floor and request that weak spots be covered with a steel plate before driving in. Damaged floors may cause an accident to persons or property; therefore, do not drive your vehicle over such floors until conditions are satisfactory.

19. What precautions should be taken when entering an elevator?

A. Be sure the combined weight of your truck and load does not exceed the safe capacity of the elevator. *Avoid eccentric loading of the car*—place your truck on the elevator so the car remains

level and does not lean toward either side.

20. What precautions should be taken when carrying a projecting load?

A. A "flag" should always be placed on the protruding portion of the load to call attention to it.

21. What precautions must be taken regarding the capacity of the truck?

A. Do not load your truck beyond its capacity or use it as a ram for pushing various materials or equipment around. Do not drive a truck which is so loaded that your vision is obstructed. Do not use the truck to carry any load other than that for which it was designated. Use the right type of truck for the job.

22. These instructions deal mainly with truck operations. What precautions can I take regarding my personal safety?

A. All these instructions refer to your personal safety and to the safety of others. The Company is interested in safety primarily from the standpoint of saving life and limb and preventing suffering.



Don't be haphazard about the selection of operating personnel on your material handling equipment. An untrained or a badly trained truck operator can do more damage to the truck and to machinery and storage along the aisles than the cost of properly training such an operator. Be sure that the operator's vision is good. Be sure that the operator is a thoroughly responsible person. Middle-aged people make better operators than young people. They take fewer chances.

Crane operators should be seasoned men, with full understanding of all of the safety rules. Many an employee has been killed by a careless crane operator. Take time to train your operators. Take time to familiarize them with every mechanical detail. Be sure that you select solid, rather than flighty, individuals. Set up for your particular plant very definite safety rules, and make your operators understand that violation of these safety rules will cause them to be discharged. Observance of such a rule will save lives, avoid accidents.

## A MOVING STORY . . .

(Continued from page 31)

sections of gravity wheel conveyor. These sections serve both as packing tables and as feeder conveyors to two powered belts which move the work from this station.

Just beyond the powered belts, the packed cartons are glued and wired, then move onto the scale platform, as shown in one of the photos. Immediately beyond the checker's desk, a third power belt inclines to an overhead section of gravity wheel conveyor. The latter provides sufficient grade to transport the cartons by gravity through a wall opening and then the full length of the shipping dock. At the end of the line an operator places the cartons on wooden skids according to shipping carrier. All orders leave the dock by highway truck or trailer.

Since the metal order picking trays would create considerable noise while rolling on the conveyor, a  $\frac{1}{8}$ " thick bottom of composition board has been riveted flush to the underside of all pans. In this way a noiseless operation has been provided. The trays have 1-in. flares on the sides, which permits them to be stacked. And their wire bead edges eliminate rough edges that would tear the books.

### Before and After

The modern procedure has not only reduced by 50% the number of man-hours formerly required for this work, but is currently also enabling girl operators to produce a considerably greater volume.

Whereas 12 to 16 stock clerks picked orders under the old method, today only six are required. And 11 packers now do the work for which previously as many as 20 were needed. Under the old method, which entailed much rehandling, the department produced 800 to 1,000 cartons per 8-hour shift, as compared with the 1,500 cartons which are prepared and shipped today without difficulty. And the capacity of the conveyor has not even been approached.

In addition, about 9,000 sq. ft. or approximately one-third of the building area, were made available



In the packing department, the gravity wheel conveyor sections serve both as packing tables and as feeder lines for the powered units, center, which move containers to next operations.

for other purposes. The details follow.

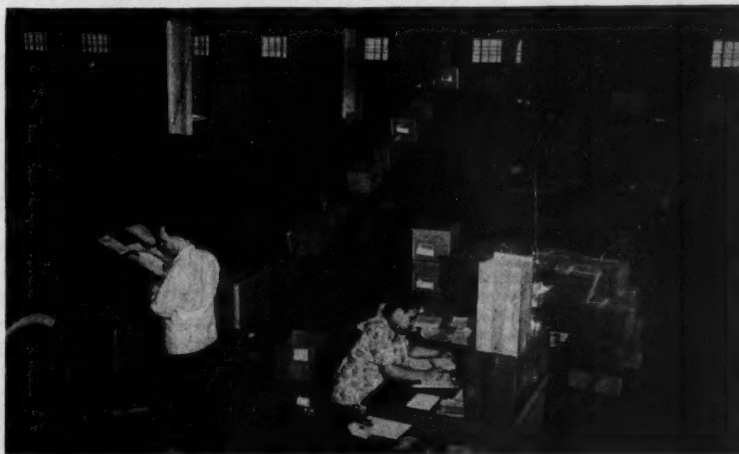
Formerly the stock clerks assembled the orders on 5-ft. long push trucks. Since the aisles had to be wide enough to let two trucks pass, the width of aisle spaces was eight ft. This compares with only three ft. used today. And when a truck was stopped it would obstruct four or five bins, thus keeping other stock clerks waiting.

Also, because of the former width of aisles, less space could be taken for the stock bins, with the result that Bibles and dictionaries could not be kept in the regular bins. These large-volume items had to be stored on skids in the permanent storage area. This resulted in considerable traffic and criss-crossing travel on the part of the 40 push trucks that were in use.

**EXCESS HANDLING:** Under the old arrangement, approximately 4,500 sq. ft. of temporary storage area were required for orders waiting to be packed, plus 2,000 additional sq. ft. of packed cartons awaiting shipment. The bracketed numerals in the following paragraph indicate the number of handlings under the old setup.

After the orders had been assembled on the push trucks (1), they were transferred to skids (2) until they could be packed. The skids were moved to the packing tables (3). After packing (4), the cartons were again transferred to the skids (5), which were then moved to the scale (6). Here the boxes were again picked up for weighing (7), then re-deposited on the skids (8). The loads were then moved to the storage area (9), where the cartons were

Weighing station: Note that table legs straddle conveyor line. Inclined powered belt transports cartons to overhead section, from there they move by gravity to endpoint in the shipping room.





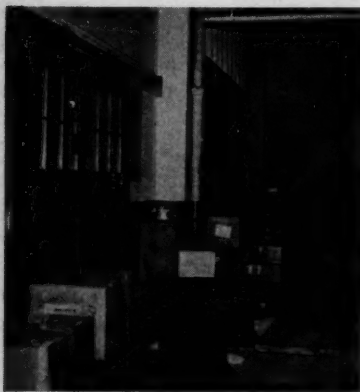
## MECHANICALLY SPEAKING

Since the conveyor sections are of the portable type, the individual units can be readjusted to suit new operating conditions or layout requirements. The conveyor sections are equipped with adjustable stands, which permit the various parts to be raised or lowered to any desired height.

Each long section of the installation arranged parallel to the 90-ft. stock bin sections is equipped with a gate, painted red, which is both a safety and convenience factor. The gates enable the workers to cross the lines without the need of trying to stop gear trains.

sorted by shipping carriers (10). When the highway trucks arrived for the shipment, the skids were moved to the shipping dock (11).

This explains how a considerable portion of the total area was wasted because of dead storage. Almost as many operators were engaged in



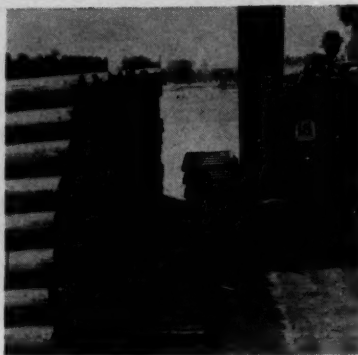
Endpoint of 550-ft. conveyor in shipping dept. picking up and laying down the cartons as were engaged in the productive work of order picking and packing.

Note how the present procedure reduced the former 11 handlings to only 4: 1. Orders are picked into trays. 2. Transfer of trays to packing station. 3. Packing. 4. Sorting on shipping dock.



Industrial tires expand under load. Therefore, allowances should be made for the clearance of tires to protect them against scraping, abrasion or cutting. A minimum overall clearance of  $\frac{1}{4}$ " is recommended between tires and any part of the vehicle they are used on (this is usually enough to allow for expansion under load and prevents the wedging of small objects between the tire and the vehicle).

## VERSATILITY IN FORGING LOADING PROJECT



HERE is more evidence of the fork truck's versatility and adaptability. The machine in Figure 1 is equipped with a pronged

prongs are projected into the cavities. In this way 36 forgeries, weighing well over a ton, are removed at one time. Thus a single operator brings many tons of forgeries to the production line daily.

In Figure 2 another fork truck (in the same plant) is shown in a car loading operation, coordinated with a motorized hand lift pallet truck. (The car is positioned about 35 ft. from the palletizing station at the end of the rocket projectile packing line.) As the truck places the palletized loads in the car, they are moved away and loaded by the powered hand truck.

Note that a portable platform has been set up on the opposite side of the car door, giving the hand



attachment, whose individual prongs act like so many weight-lifting fingers. This accessory was designed for handling rough forgeries, used for rocket projectile bodies, that resemble 5-in. artillery shells. As the truck runs up to the stockpile, shown at the left, the

truck operator necessary room for maneuvering. When the center of the car is being loaded, provision for additional maneuverability is made by placing a platform at the other car door as well.—*Courtesy, Westinghouse Naval Ordnance Plant, Canton, O.*

THE course and extent of unit loads in transit in the future will depend on the outcome of the following factors: 1. Special rail freight rates for pallets bearing commodities rather than the commodity rate. 2. Wider use of suitable highway trailers and trucks with attractive rates. 3. Development of suitable low-cost, light-weight shipping pallets. 4. Development of equipment to handle unit loads of certain packaged goods in transit.

## 1404 FEET IN 17 MINUTES...

(Continued from page 17)

Boxes strike an idler at the left corner of the roller conveyor section, and are turned into position as the take away conveyor pulls them away. They travel a few feet and are positioned more accurately on the belt as they pass between the guides described. The contact with the guides causes a pin to elevate and block the passage at each feeder line immediately ahead. At the same time the power for the other feeder lines is also shut off. After traveling boxes have passed a particular feeder line, the pin drops down, clearing the line for the waiting boxes.

The take away belt brings the boxes to a transfer station, where they are routed to other departments for additional processing or assembly, or to the stock room.

In the rivet department, the many pieces which make up an assembly are carried in metal baskets suspended from an overhead mono-rail cable conveyor. These baskets pass over the assembly tables and are ideal for easy removal and for keeping the parts together for particular assemblies.

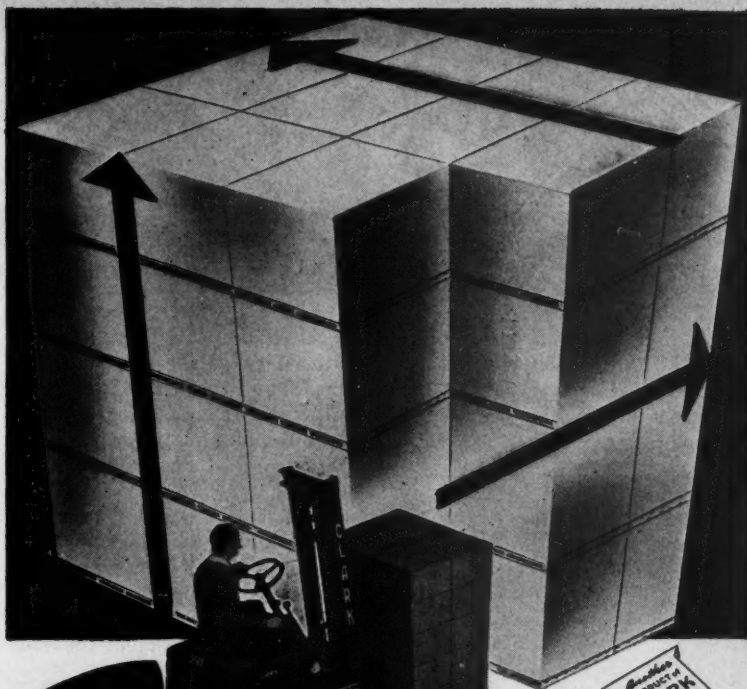
In the final assembly departments, tables with roller beds aid in moving the work between stations. As the machine takes shape, it is set upon a stand with rubber-tired wheels, which is easily pushed about.

After final inspection and crating, platform lift trucks move the heavy machines to elevators, which take them to the shipping department.



If at all possible, avoid driving or parking rubber-tired vehicles in any substances detrimental to crude or synthetic rubber. Avoid oil, greasy or gasoline soaked areas. Wipe off such substances without delay if tires are placed in contact with them.

Tires "flat-spot" when loads are left standing on the vehicle for any length of time. Once a flat spot develops, the tire bumps at this point as it turns, causing separation of the tire from the steel base. Watch those standing loads.



# 3

## DIMENSIONAL USE OF SPACE THROUGH THE TIERING SYSTEM!

### CLARK fork trucks utilize all factors in material handling

- ✓ High stacking utilizes "ceiling heights" or "air rights."
- ✓ Speed in handling utilizes time.
- ✓ 24 hour a day performance utilizes round the clock availability.
- ✓ Low cost operation and long life utilize savings on investment.
- ✓ Clark Fork Truck performance utilizes all factors in material handling.

## CLARK TRUCTRATOR, BATTLE CREEK, MICHIGAN

Products of CLARK • INDUSTRIAL TRUCKS AND TRACTORS • BOOSTER UNITS • EASY ROLL TRAILER AXLES  
AXLES FOR TRUCKS AND BUSES • GEARS AND FORGINGS • ELECTRIC STEEL CASTINGS • METAL SPOKE WHEELS  
TRANSMISSIONS • AXLE HOUSINGS • RAILWAY TRUCKS • BLIND RIVETS • HIGH-SPEED DRILLS AND REAMERS



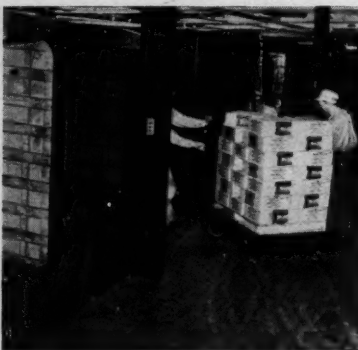
**T**HE following "off the shipping dock" operations, recently observed in various cities, may suggest some practical ideas applicable to your own plant.



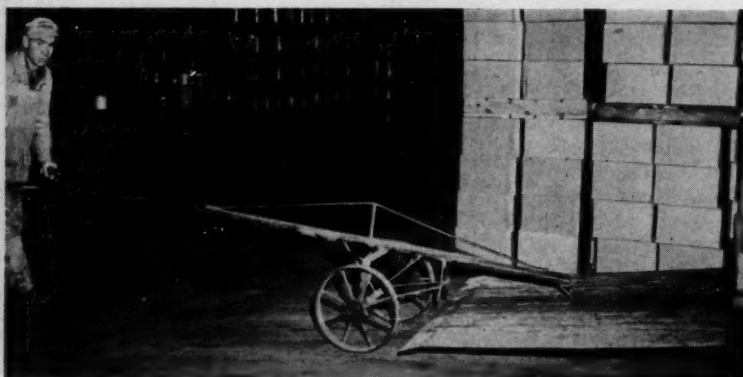
A bridge plate is used to load freight cars at the end of a boiler tube room. This bridge plate is equipped with sills to keep the trucks from going off the side. An angle iron is welded to the bottom and a few inches in from the end, which fits into the entrance to the freight car and acts as a brace against the car. A bead on the un-

der side of the plate fits in a groove at the edge of the shipping platform. Thus the plate is securely positioned. It is carried the length of the shipping platform by means of a chain hoist which travels on a monorail.

The truck loading dock of the Sherwin Williams Co.'s warehouse, Chicago, is equipped with permanently installed bridge plates which are hinged to the edge of the dock



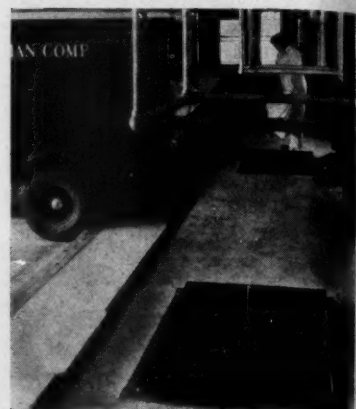
—one in each bay. The plate in the lower left-hand corner is shown in an "up" position, while the ad-



**SAFE HANDLING** of car bridge plates is made possible by means of this lever dolly, which is equipped with a hook. The hook is inserted in a slot in the center of the plate, and the latter is then easily lifted and moved to any desired location. This method has eliminated the hazards that attended manual handling of heavy steel plates at the warehouse of the Chicago plant of the Sherwin-Williams Co.

joining one has been dropped onto the truck for loading. The permanently installed plates can never be lost, and at the same time the handling has been reduced to a simple raising and lowering operation. This is both a safety and efficiency feature, which is contributing to the speedy loading of trucks.

In use at the Chicago Laundry of the Pullman Co. are the angle iron lips shown in this photo. The trucks that load and unload at this dock



are all of a standard size, and a tail gate dropped on a lip forms a level surface with the loading dock. This arrangement provides sure and safe footing for operators who carry out the individual bags for unloading, or who run hand trucks into the vehicles for loading purposes.

**MOVING TINPLATE**—This truck, designed to handle tinplate, is moving the product regularly from the cutting machine to the sorting and inspection table, and then to the shipping department. The weight of the load causes the clamps to tighten their grip, and thus hold the tinplate securely. The truck's capacity is 4,000 lbs.—*Electric Industrial Truck Assn.*





# Catalogues

## LITERATURE and BULLETINS

### 35—Materials Handling Equipment

... A 12-page illustrated booklet presenting a full line of standard and special steel skid platforms and form units. Included in the latter are types with sliding end doors and hinged doors, as well as standard caster type box units. Also included are steel pallets, both single and double face, and a variety of tote boxes. The illustrated text explains the use of this equipment on the production line. A Truscon Steel Company presentation.

### 36—Clark Carloader Method

... a new booklet that presents the subject of material handling analytically according to the view points of top management, purchasing agents, production engineers, sales managers and transportation executives. The emphasis is on material handling as an essential phase of planned production. A Clark Tractor publication.

**37—Industrial Locomotives (diesel-electric)** ... how they perform in yard, mining and other industrial operations. This catalog contains engineering specifications, operational and maintenance data, including a listing of users. A presentation of the General Electric Co.

**38—TelAutograph Telescriber** ... for transmitting data instantly in writing to one or many points. This illustrated presentation consists of two circulars and three data sheets. The circulars show how the device helps

speed requisitioning and material handling. The data sheets describe actual requisitioning and inventory control applications. Obtainable from the TelAutograph Corporation.

### 39—Load Moving Equipment

... Five new circulars just released by the Materials Handling Division of the Market Forge Co., Everett, Mass. Each one covers one of the following subjects. 1. Load lifts. 2. Load Pacs. 3. Load Carriers. 4. Standardized Material Handling Equipment. 5. Load Movers. Fully illustrated, these circulars give complete data pertaining to operational features and engineering specifications.

**40—Electric Lift Truck** ... with power for lifting and power for travel, recently added to its line by Yale & Towne Mfg. Co., is described in a new catalog. The publication gives complete information on its operation, construction, and the various uses of the two models available (pallet and platform).

**41—Roller Wheel and Power Conveyors** ... an 8-page presentation released by the Standard Conveyor Co., covering roller and wheel conveyors, portable piling machines, horizontal and cleated belt conveyors and other equipment and attachments. Specific applications in warehouses, food industries, bottling plants and flour and feed mills are illustrated.

**42—Tractors** ... Designed to assist operators in the selection of proper

tractor tools, a new 8-page folder has recently been released by R. G. LeTourneau, Inc. It describes and pictures the company's various current models—Tilt-dozers, Rooters, Cranes and Power Control Units. On-the-job photos show each type of equipment in a different application.

**43—V-Solid Fibre Boxes** ... a 16-page illustrated brochure, prepared by Container Testing Laboratories, Inc. Background information is given on the performance of these containers during the war years, when they were developed. Numerous data are included on rough handling under field conditions, construction features, quality control, special performance tests, including tables with the results obtained in these tests. Applications to private industry are discussed.

**44—Industrial Truck Tires** ... how to maintain them for low operating cost—discussed in a 36-page attractively illustrated presentation by the B. F. Goodrich Co. Specific factors are pointed out in regard to hauling time, floor wear, noise, accidents, etc. Specifications are given on commercial cushion tires, industrial pneumatics, Pressed-On Tires, Vule-On Wheels, retreads and others. A special section is devoted to tire care and maintenance.

**45—Gravity Wheel Conveyors** ... A new illustrated catalog on Rapid-Wheel Gravity Conveyors by the Rapids-Standard Co., Inc. The publication contains information on the construction features and uses of the eight models made by the company, together with complete specifications and data on standard accessories. On-the-job photos illustrate various types of applications.

**46—Traveling Cranes** ... The large variety of load handling jobs performed by crawler type and wheel type Roustabout Cranes is described in a series of circulars. The text is illustrated with numerous action photos of operations at factories, airports, docks, railroads, shipyards, and other activities. Offered by The Hughes-Keenan Co.

**47—Steel Strapping & Bands** ... A fully illustrated folder showing the application of steel strapping for cartons, boxes, crates and bales; and of steel bands for carloads, truckloads and skidded shipments. Included is a discussion on strapping in relation to added protection of shipments and reduced loss and damage. Available from the Brainard Steel Corp.

**48—Pallets, Skid Platforms** ... A circular describing six different types of material handling units. Included are corrugated steel deck pallets, skid nesting sections, wood deck skid platforms, and all-steel (corrugated deck) skid platforms. Complete construction data are given. From Phillips Mine and Mill Supply Co.

## MAIL THIS COUPON FOR FREE LITERATURE

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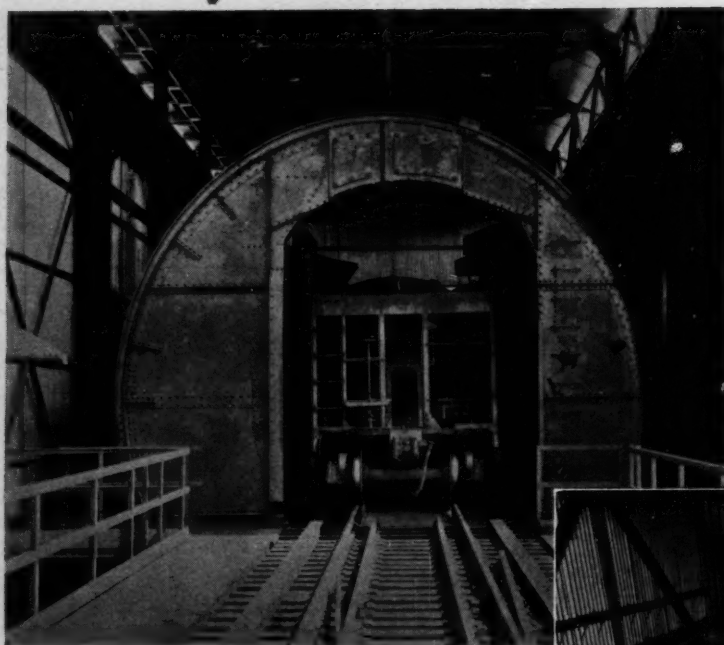
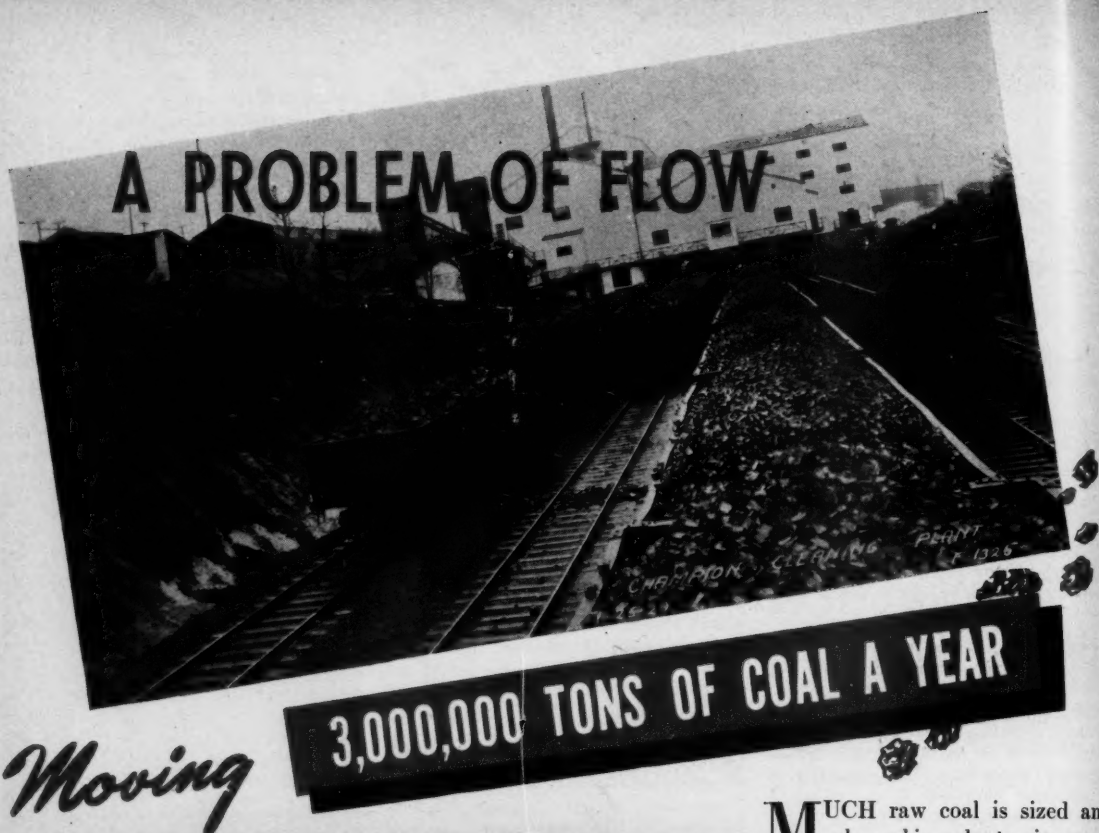
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12-45



**In order to give the consumer prepared coal at economical prices, the volume through the preparation plant must be handled at low cost per ton. There are lessons for other bulk handlers in this presentation on a leading company.**



**M**UCH raw coal is sized and cleaned in order to give maximum performance for particular industrial and domestic uses. Due to mechanical mining, the product contains considerable refuse. As a result, hand preparation at the mine is not adequate either for the tonnages involved or to efficiently clean the coal. Thus, preparation has to be put on a mechanical basis in separate plants. Cleaning and sizing in special prepara-

Top photo: Line-up of loaded cars at Champion No. 1 Plant, background, suggests huge volume handled. Left: Rotary car dumper shown is somewhat different from model in actual use. Below: This is 60" raw coal feed belt with hourly capacity of 1,000 tons.

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tion plants, in turn, requires that this extra handling be geared to large-volume, low-cost methods. This need is met with mechanical handling devices.

A recognized pioneer in the field of coal preparation is the Pittsburgh Coal Company. Its Champion No. 1 mechanical wet cleaning plant, the subject of this article, was one of the first of its kind and size in the country. In 1944 it sized and cleaned 3,167,023 tons of coal.

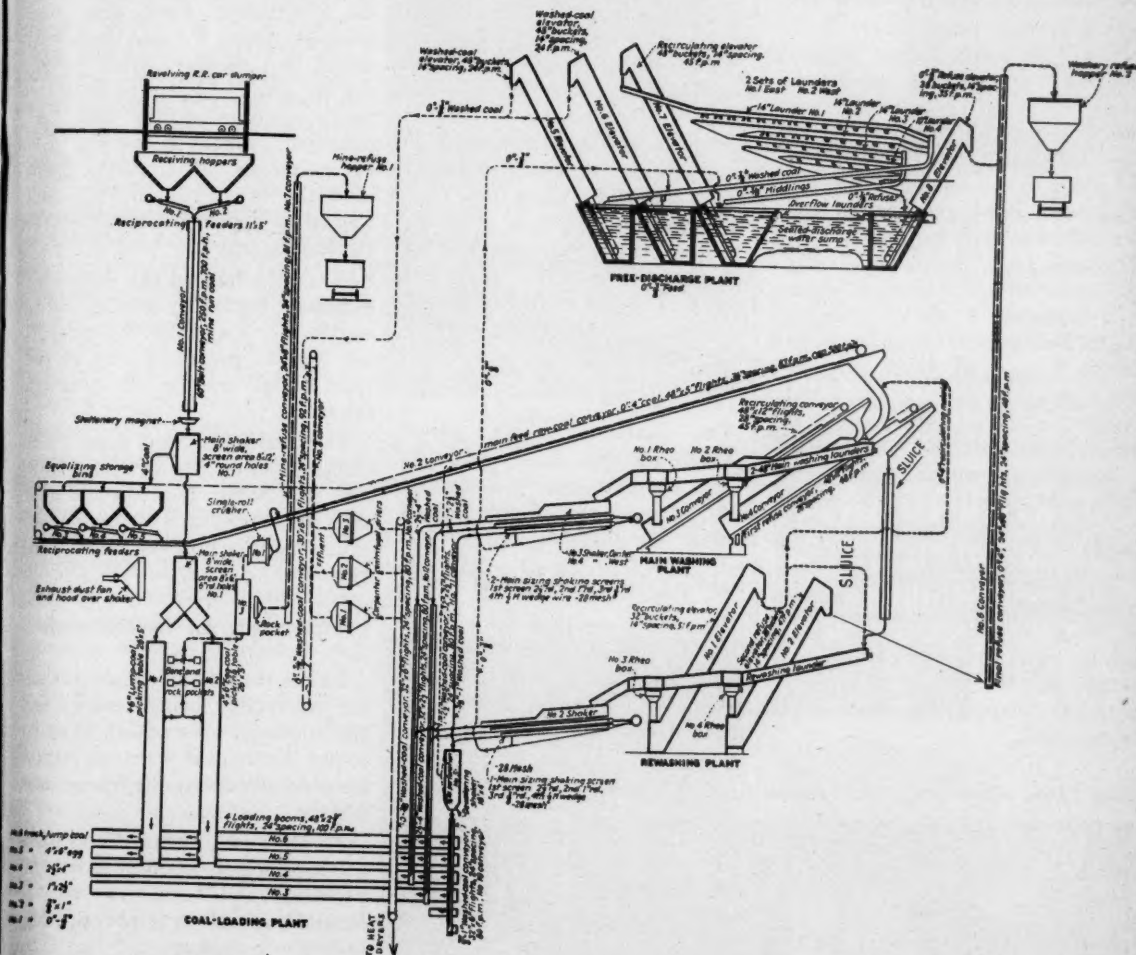
The lines of flow of the various sizes through the plant can be con-

A continuous rope-type car haul positions the individual cars on the dumper (see photo), which discharges the coal into the receiving hopper underneath. The rotary car dumper has ample capacity to keep the plant operating at the rate of 1,000 tons per hour.

A coal preparation plant is an intricate system of handling devices—and this one can handle 1,000 tons an hour. Omitted from this simplified flow sheet are various processing machines, also heat dryer plant. Its location is indicated by arrow at left side, bottom, of flow sheet.

sizes. The two larger of these sizes move to the picking tables, where impurities are removed by manual operation. The flow sheet shows how the plus 6-in. and 4 x 6-in. coal is conveyed directly to the No. 5 and No. 6 loading booms.

The bone and rock products taken off the picking tables are distributed to another picking table (No. 3 on the flow sheet), where the pieces containing coal are discharged to a crusher. From here they move into the main washing plant on the No. 2 conveyor.



veniently followed by means of the flow sheet on these pages.

### 1,000 Tons Per Hour

Champion No. 1 is a central preparation plant that serves five mines within a radius of 440 miles. The raw coal arrives in standard railroad hopper cars, which are switched to a raw storage track leading onto the rotary car dumper.

The coal is fed from the hopper to a 60-in. belt conveyor by two 11 x 5-ft. reciprocating pan-type feeders with an hourly capacity of 500 tons each. The belt conveyor, which operates at 250 F. P. M., can deliver 1,000 tons per hour of coal to the main shaker.

### Large Sizes Speedily Handled

The main shaker separates the plus 6-in., 4x6-in., and minus 4-in.

slate is carried by mine refuse conveyor to the hopper, which discharges into railroad dump cars.

### Routing Minus 4-in. Coal

While the handling of the two larger sizes is comparatively simple, the smaller sizes require considerably more treatment and handling.

The flow sheet shows how the minus 4-in. coal is routed to the





The shaking picking table for removal of slate. raw coal bins, from where it is carried by reciprocating feeders into the lower run of the main conveyor. (The latter feeds the coal into the main launders.) From the raw coal drag the coal is conveyed by chute to the washing launders, where coal and impurities are separated in a moving stream of water. The coal from these launders is sluiced to the sizing screens, where it is sized into 4 primary sizes by round hole screens. Excepting the minus  $\frac{3}{8}$ -in. coal, these primary sizes are carried by washed-coal conveyors direct to the loading booms.

As indicated on the flow sheet, these conveyors run at right angles to the booms, so that any size or mixture of sizes may be loaded on any one or all of the booms in various proportions.

The gates that control the mixing on these conveyors are so arranged that the mixing can be done without delaying the operations in the plant.

The loading booms can be raised or lowered according to the progress of the loading operation, in order to prevent breakage of the coal moving into the cars.

#### Rewashing Plant

Primary refuse that drops down the No. 2 Rheo box to No. 4 conveyor is conveyed to a gravity chute which feeds into the rewash launder.

The product that drops through the No. 1 Rheo box is discharged into and conveyed by No. 3 conveyor to the feed of the main washer launder, where it is rewash.

(Rheo boxes catch the refuse which is sufficiently heavy to fall through counter-currents created in the boxes. The salable coal, on the other hand, is lighter in weight and is carried by the stream over the boxes onto the sizing screens.)

In the rewash launder, the final refuse goes through the No. 4 box to No. 2 bucket elevator, thence to the final refuse conveyor. This takes the load to the refuse bin, where it is fed by gravity into railroad dump cars.

The material which passes through the No. 3 box into the No. 1 elevator, which discharges into the head end of the rewash launder, is rewash.

#### Handling $\frac{3}{8}$ -in. (Pulverizer Fuel)

This size is screened through the bottom deck of the sizing screens and sluiced into the boot of bucket elevator No. 7. From here it is carried to the free discharge laun-

ders (top right, flow sheet). With the exception of the product handled in top "A" launder, the clean coal is conveyed by No. 5 elevator to No. 8 conveyor, through the No. 1, 2, and 3 centrifugal driers, then to No. 9 conveyor, which discharges into the top strand of C conveyor.

Top A launder products are sluiced to a dewatering screen, the oversize of which is also delivered to the No. 9 conveyor. The latter delivers the pulverized fuel into three 50-ton bins (not shown on the flow sheet). From these bins the pulverizer is fed into three heat driers (not shown). After drying, the fine coal is discharged from the revolving drier drums into "A" conveyor, which discharges into "B" conveyor. "B" conveyor drops onto the lower run of "C", and the latter delivers the product to the loading plant.

While the bulk of the pulverizer is usually loaded by gravity chute on the No. 1 and No. 2 tracks, it can also be routed to any of the four booms loading the primary sizes.

The final refuse from 3/8x 0 free discharge boxes, shown under launder (top right, flow sheet), goes directly to the No. 8 elevator boot, which empties into the refuse conveyor.

#### Experiments for Improvements

Latest techniques and devices are constantly being tested, and the approved ones added, in order to put through the plant the largest possible volume at the lowest cost per ton.

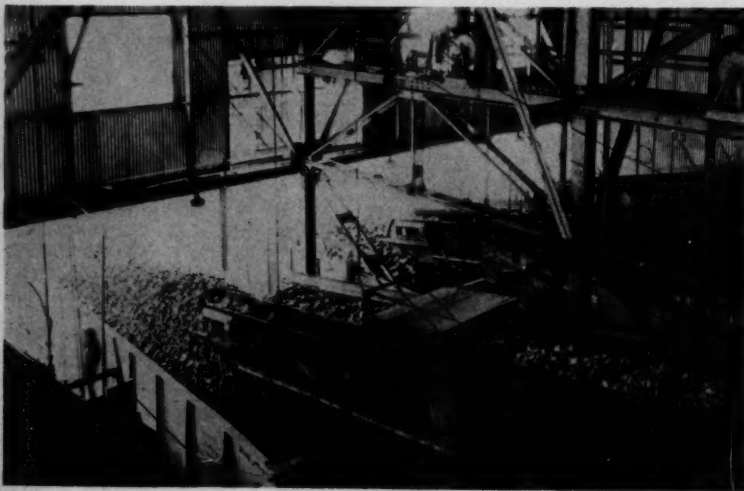
All conveying and elevating units are installed to suit the particular problem and material to be handled, as well as to prevent degradation from drop.

Experiments are also constantly being carried on in order to reduce maintenance and power consumption, and to keep at a minimum delays due to mechanical failure. (See also paragraphs on "Conservation" in section immediately following.)

#### Mechanically Speaking

The following describes the types of conveyors and chains used in

Shown loading railroad cars are chain-conveyor type loading booms, which reduce breakage.



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the various elevator and conveyor units.

No. 1 conveyor: 60-in. rubber belt; speed 250 F. P. M.; inclined 19 degrees; equipped with roller type mechanical back stop.

No. 2 conveyor: 48" x 15" flight conveyor, equipped with 9148 rivetless chain made of SAE 1045 heat treated steel links and SAE 4140 heat treated steelpins.

No. 3 and 4 conveyors: 48" x 12" flight conveyor equipped with 14" pitch bar link chain, made of SAE 1045 heat treated steel links and SAE 4140 heat treated steel pins.

Conveyors 8 to 12, incl. and loading booms 3 to 6, incl.: Flight conveyors equipped with 678 rivetless chain made of EEE heat treated steel, pins and links.

Elevators No. 1 to 8: Perforated dewatering buckets with 14" pitch bar link chain made of SAE steel, heat treated and SAE 4140 steel pins, heat treated.

Refuse conveyors: Flight conveyors equipped with 12" bar link chain made of SAE 1045 heat treated links and pins.

One 19" and two 13" Redler conveyors, equipped with alloy steel links, are used in the plant for making an auxiliary, dedusted product (not shown on flow sheet).

**CONSERVATION:** All conveyor chains are installed with materials designed to prevent corrosion and abrasion. In order to reduce corrosion and increase the life of the chain, tests are continually run on various corrosion resisting alloy steels.

The loaded sides of the flight conveyors are equipped with 3/8" thick plain carbon open hearth steel plates, which have a short life due to corrosion and abrasion. As a result, the following materials are under test for conveyor bottoms: stainless steel, stainless clad steel, high manganese steel, enamel steel, glass, bronzes, and concrete.

**LOADING WITH CAR HAUL:** The car haul consists of an endless rope hoist, driven by an 80 H. P. motor, with magnetic brake. The hoist handles ten 70-ton railroad cars on a .3 of 1% down grade. The hoist is controlled from the dump operating station by the dump operator. The 1-1/8" endless rope is

equipped with a shackle attachment for connecting to the car. The rope travels at the rate of 80 ft. per minute.

### POWERED BY AIR HOIST

**A**N unusual use of an air hoist is illustrated (Figure 1) in this operation at the Ferro Machine

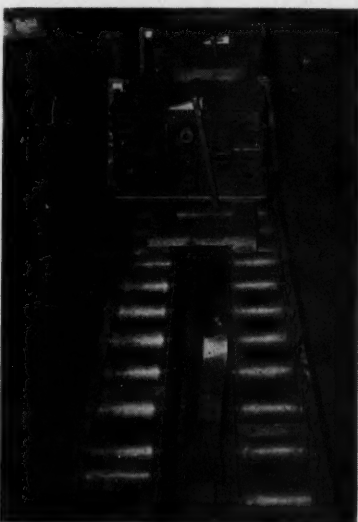


Figure 1

and Foundry Company, Cleveland. Between the sections of the split conveyor is a dog, operated by the hoist. This dog moves the flasks horizontally to the mold pouring station, and then drops down and

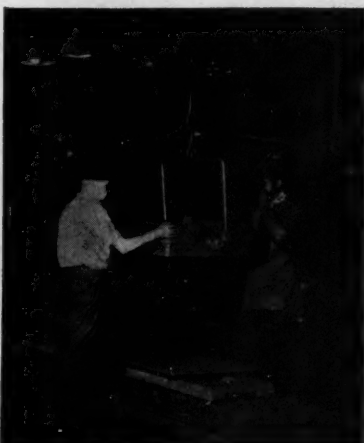


Figure 2

passes back underneath for the next flask.

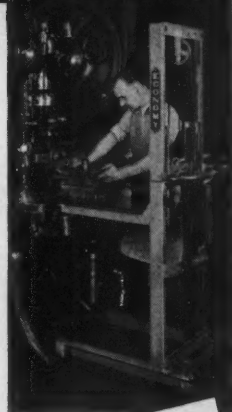
Figure 2 shows an air hoist being used to lift and handle molds. It also aids in turning the flasks during the molding process.

## Save production time with a SHOPLIFTER

ONE-MAN OPERATION

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Handling Dies, Fixtures, etc.  
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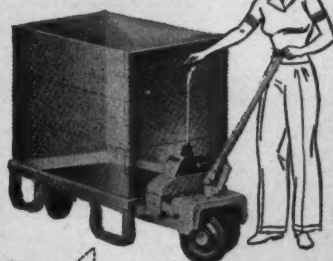
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## STANDARDIZED MATERIALS HANDLING EQUIPMENT

### LOAD-LIFTS

SEND FOR LOAD-LIFT MANUAL NOW



### SIMPLIFY YOUR HANDLING PROBLEMS

The use of the Load-Lift system will greatly increase your plant efficiency for the smallest capital investment of any adequate materials handling system. Saves double handling — utilizes space advantageously — reduces fatigue — eliminates damage from elements.



**MARKET FORGE CO.**  
60 GARVEY ST., EVERETT 49, MASS.

# What Do You Know

**Do you know your packing costs and those of your suppliers?  
An analysis of the data presented here may help you make  
savings. Such economies are obtainable in many products.**



Figure A, above  
Figure B, right 1.  
Palletized fire-burners  
as compared to  
loose crating—50%  
cost reduction

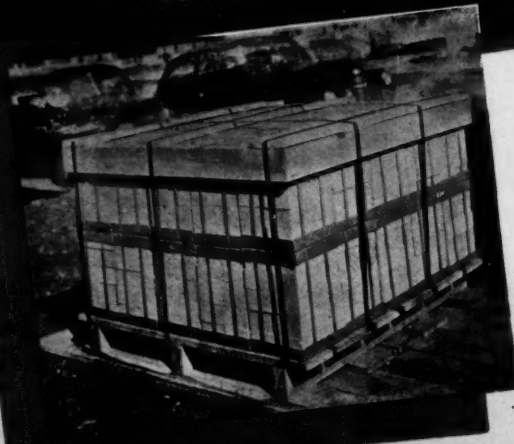
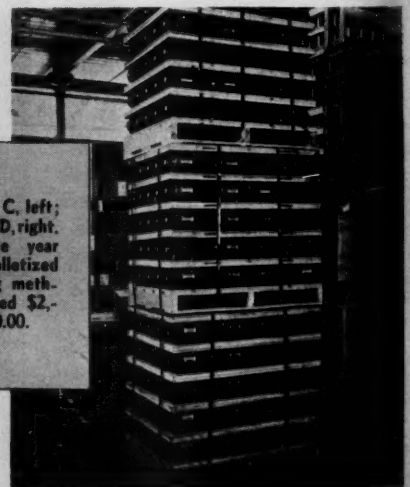


Figure C, left;  
Figure D, right.  
In one year  
the palletized  
loading meth-  
od saved \$2,-  
770.00.



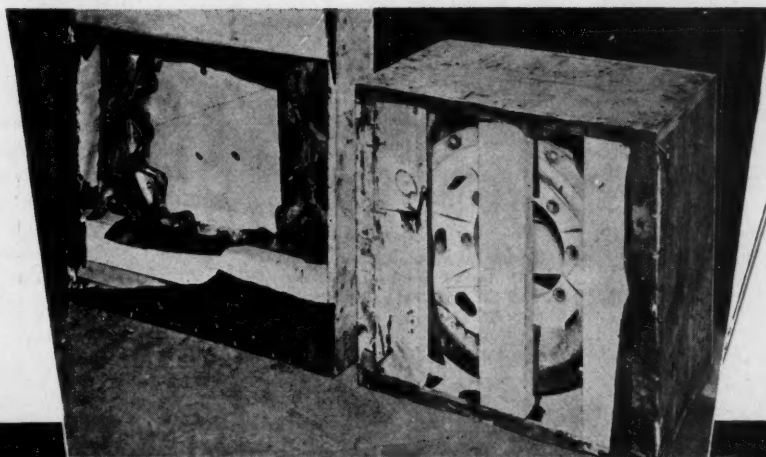
**T**HE exhibits on these pages illustrate how startling savings were made in a number of instances—typical examples of the economies that can be achieved when the unit load of shipping is used rather than the “loose package” method.

When considering making shipments of any of your products in unit loads, or when instructing your suppliers to ship in unit loads, whether palletized or not, first obtain complete packing costs and tare weights. Then it is well to limit the material and labor costs of the proposed unit to the former equivalent cost, taking into account freight differentials of the tare weights. Include the cost of returning the pallet, if a returnable pallet is used. On this basis, all of your material handling savings are additional economies.

When dealing with incoming production materials, the chances are that your supplier can effect similar handling economies, which will offset any special setup that may be

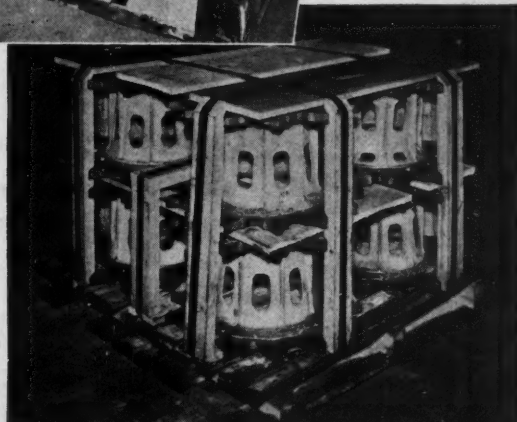
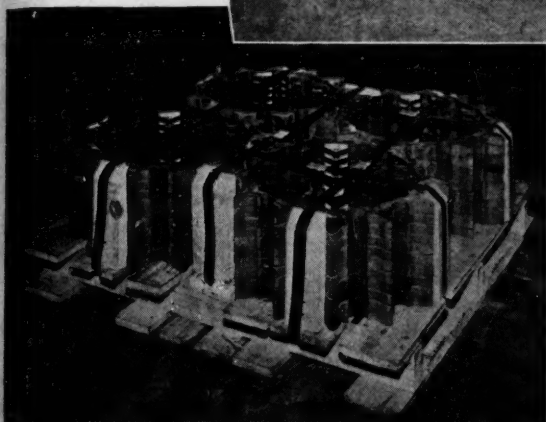


# About Your Costs?



To the right Figure E is shown the original packing for shipping sprockets and hubs. This system was both inadequate and expensive. Below, left

Figure F is the palletized sprocket load alone and below, right, Figure G the unit load of spare hubs. The analysis shows startling savings.



SPARE SPROCKETS		Old Method	Unit Load Method
NOMENCLATURE			
Number required for 100 vehicles	400	352*	
Number shipped per unit	2	44	
Number of loads for 100 vehicles	200	8	
Gross weight per load	109 lbs	1525 lbs	
Board feet of lumber per unit	15	38	
Weight of lumber per unit	45 lbs	117 lbs	
Total weight of lumber used 100 vehicles	9000 lbs	936 lbs	
Total board feet of lumber used 100 vehicles	3000	304	

## ANALYSIS

Resultant savings per month—unit load method versus present method:

\$74 Less loads to be handled.  
\$888 Board feet of lumber saved.  
\$970.56 Lumber value saved.  
\$323.52 Saved in carpentry labor.  
\$708.83 Saved in freight on weight difference of lumber.  
\*48 Sprockets are shipped with hubs.

Total Dollar Savings—  
Lumber — Carpentry —  
Freight — for spare  
sprockets for one month's  
production of LVT's—  
\$2002.91.

SPARE HUBS		Old Method	Unit Load Method
NOMENCLATURE			
Number required for 100 vehicles	24	24	
Number shipped per unit	1	8	
Number of loads per 100 vehicles	24	3	
Gross weight per load	127 lbs	1290 lbs	
Board feet of lumber per unit	17	66*	
Weight of lumber per unit	51 lbs	170 lbs	
Total board feet of lumber used 100 vehicles	408	198	
Total weight of lumber used 100 vehicles	1224 lbs	510 lbs	

## ANALYSIS

Resultant savings per month—unit load method versus present method:

\$3 Less loads to be handled.  
\$30 Board feet of lumber saved.  
\$75.60 Lumber value saved.  
\$25.20 Saved in carpentry labor.  
\$62.76 Saved in freight on weight difference of lumber.  
Including pilot.

Total Dollar Savings—Lumber—  
Carpentry — Freight — For  
spare Hubs for one month's  
production of LVT's—\$163.56.



Note accessibility for a fork truck and inset boards for ship's gear. Load was tested in 42" drop, was then rolled over. Here it shown after test—best proof of its ruggedness.

necessary to comply with your wishes. In many instances, a reduction in the price of a product has been made as a result of the supplier's adopting the same practices in his operations.

Let us consider some specific examples. A manufacturer of fire brick saved the following per 1,000 bricks (Figures A and B):

Labor .....	60%
Lumber .....	68 bd. ft.
Steel strapping .....	139.7 ft.
Nails and staples .....	12.9 lbs.
Straw .....	240.5 lbs.

The reduction of the palletized unit load cost was \$22.34 per 1,000 or about 53% of the former cost when crates were used! In addition, the weight was reduced 18.5 lbs. and the cubic measure 11.2 cubic ft., which meant transportation economies.

A manufacturer of zinc plates experienced this situation in shifting from boxes to single deck pallets and runners type units:

Cost of former method .....	\$1,908.24
Cost of new method .....	906.13
Net savings .....	1,002.11
Savings in freight due to reduced weight .....	1,189.91

The next example is illustrated in Figures C and D. It involves a manufacturer of electric motors who shifted from cartons containing two motors to unit loads of 100 motors. Note the framed plywood separators, which absorb shock and make for a secure load during all handling and a 900-mile rail haul. The pallets and separators were returned and used upwards of nine

times. Calculation reveals a saving in one year of \$2,770.00.

Figures E, F and G: One of many manufacturers of replacement sprockets and hubs for the Navy's tracked landing vehicles saved \$18,416.51 per month. This

saving resulted solely from reductions in packing material, labor and freight savings in shipping parts for 300 vehicles.

Here is how the picture looked for a spare part analysis:

Nomenclature	Old Method	Unit Load Method
Number of pitches to a load.....	60	90
Number of loads per 100 vehicles.....	311 boxes	207 unit loads
Cross weight per load.....	1,407 lbs.	1,300 lbs.
Board feet of lumber per unit.....	75 lbs.	6 lbs.
Weight of lumber per unit.....	220 lbs.	20 lbs.
Total board ft. of lumber used		
100 vehicles.....	23,325 lbs.	1,242 lbs.
Total weight of lumber used 100 vehicles..	68,420 lbs.	4,140 lbs.

**ANALYSIS:** The above nomenclature is based on spare parts for 100 vehicles. Based on production of

300 LVT's per month. The resultant savings, per month, unit method versus present method are:

312 less loads to be handled.  
66,249 board feet of lumber saved.  
\$7,949.88 lumber value saved.  
\$2,649.96 saved in carpentry labor.  
\$5,650.20 saved in freight on weight difference in lumber.

**Total Dollar Savings—Lumber—Carpentry—Freight—**  
For spare track for one month's production of LVT's—\$16,250.04.

**A final point:** In order to turn in a good performance on material handling, the specialist must work very closely with the packing specialist. Changes in practice like those described here often mean

shifting from cartons to wooden boxes or vice versa. And items formerly shipped loose may be built into units, while boxed items may be replaced by palletize unit loads.

JANUARY						
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27	28	29	30	31		

#### NEXT MONTH

In a warehouse of the world's largest paint manufacturer a number of overhead and on-the-floor handling devices are coordinated in an unusually flexible operation. Some 10,000 different items—ranging from a broken case-lot of half-pint cans to a solid carload shipment of 55-gal. drums—are classified, stored and shipped.

Our January article on this operation covers all significant aspects. . . . Practically every plant has its own method for removing scrap—and engineers are constantly looking for a better way. An article describes the ingenious system of a leading manufacturer of electric motors. It is exceptionally efficient and may well suggest a solution for your problems. . . . A manufacturer of wooden tanks developed modern methods for handling lumber and large tanks—another on-the-scene report, vividly presented with numerous photos. . . . Newspaper handling is a problem in many a plant using large rolls of papers. A featured article describing the methods of a nationally prominent newspaper has pointers for other users of paper in roll form. You will find these and other down-to-earth, how-it's-done articles in FLOW for January.

#### LOAD LIFTS

**T**HE Materials Handling Division of the Market Forge Co., Everett, Mass., announces its Load-Lifts, designed for lifting and transporting heavy loads. Each of the two models offered is said to have a 20 per cent overload lifting capacity. When this is exceeded, a safety device similar in effect to an electric fuse relieves the load pres-

sure, eliminating damage possibilities and other disadvantages.

The models are described as being equipped with sealed ball-bearings in all-steel wheels, providing a self-lubricated operation. Fewer parts, arc-welded frame construction and rounded corners are other advanced features incorporated in the models, it is stated.

## PIPE DREAM...

(Continued from page 34)

### Pendant Control and Draining Hooks

In the pickling house an overhead five-ton crane (pendant-controlled) travels the width of the room. Two pendants are suspended from the trolley and are of the push button type. Either pendant can operate the crane, and the use of two pendants enables the operator to guide the work into the tanks on opposite sides of the aisle. Note the lifting beam with hooks set at different levels. This permits the lift in the slings to drain off acids into the tank upon removal.

In the alloy tube building are two cab controlled five-ton cranes. One of these cranes is also pendant-controlled for operation by the night crew when a crane operator is not on duty.

### Handling Aids

Hairpin hooks which thread over the hook on the lifting beam are used for lifting the coils. These hooks are stored in a pit in an upright position for easy threading and removal.

A movable scale on a platform mounted on wheels eliminates re-handling. It weighs and transfers stock from the alloy tube room to the boiler tube room or vice versa. Angles set in concrete support the wheels under the load. After transfer, the crane loads the truck or gondola for shipment.

Tubular method of racking coils consists of long round tubes welded to flat tubing to form a rack. The channel of flat tubing is bolted through the floor into the concrete. The curvature of the tubes makes a good bed for the curved coils. The rack is very strong and can sustain a heavy load and hold it in position.

In feeding small diameter tubes into the straightening machines, it was found that these tubes had such a "whip" as to be dangerous. Now a large piece of steel pipe is used and the tube is inserted in the pipe which limits the whip action.

The careful, efficient movement of material, from the arrival of the coiled steel to the shipping of the tubes, is an important part of the plans for processing "welding tubing" for the refrigeration, chemical and many diverse industries.

## CANNED ENGINES

CANNED aircraft engines are now being shipped to the planes used in the occupation of Japan and other territories in the Pacific.

To protect motors from excessive moisture and damage in handling, the Warren City Manufacturing Company, Graham-Paige subsidiary, is welding air-tight steel containers in which the engines are mounted on shock-proof rubber cushions. The containers, designed by the Bureau of Aeronautics, are 8 ft. tall and 5 ft. in diameter.



## Cut Battery Charging Costs



## This patented DIVERTER POLE BATTERY CHARGER does it ...

Developed particularly for battery charging, this machine has PATENTED Hobart Diverter Pole Winding. Is unusually compact and light in weight. It is a two-bearing set, the squirrel cage AC rotor and DC Generator armature being mounted on a solid shaft, supported at each end by oversized bearings • Four models, Single Circuit, Two Circuit, Three Circuit and Four Circuit, for charging one, two, three or four batteries simultaneously. Fully automatic, shutting down in case of power failure or when battery is charged. Custom-built, totally enclosed and splashproof. Write your requirements. Will submit specifications and prices on suitable charging equipment.

**MOTOR GENERATOR CORP., BOX FL-125 TROY, OHIO**

Division of Hobart Bros. Co.

**MOTOR GENERATOR CORP., BOX FL-125 TROY, OHIO**

Please send me without obligation complete information on your vehicle battery charger. We require equipment for charging \_\_\_\_\_ batteries of \_\_\_\_\_ ampere hour capacity, with \_\_\_\_\_ plates per cell, \_\_\_\_\_ cells per battery. Motor should operate on \_\_\_\_\_ current.

Name \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_







For additional information on these products, write Dept. 5, Flow Magazine, 812 Huron Rd. Cleveland 15.

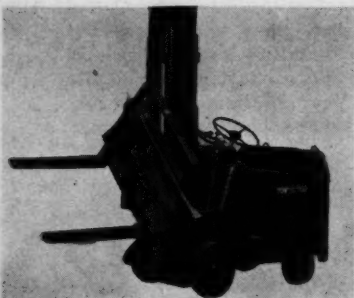
#### HOLDS THE BAG

**A**N improved design of its Bag-Holding Truck has been announced by the Chicago Manufacturing and Distributing Company. The manufacturer supplies the following details.

The Bag-Holding Truck is said to accommodate any size bag, which is attached to the spreader band without adjustment. The height of the band can be set at any position, from 18" to 40" high. The bag is held in position by five strong malleable iron cam locks. The base is made of malleable iron casting mounted on 6" or 8" diameter wheels. The large gripping area of the cam prevents tearing of bags and there are no sharp points or edges to injure the hands, it is claimed.

#### THE UPENDER

**I**NFORMATION on a new lift truck accessory, designed for the paper industry, has just been released by the Towmotor Corporation, Cleveland. Called the Upender, the accessory is also said to



be suitable for use in handling operations requiring movement of cylindrical loads in either vertical or horizontal position. The device is designed to up-end rolls from vertical to horizontal position, or vice versa. According to the manufacturer, safe and speedy carrying

and stacking of rolls is made possible with minimum effort.

In operation, the Upender blade slides under the roll of paper. The carriage is then revolved, permitting the roll to be carried in a horizontal position. In stacking, the roll may be kept in a horizontal position or returned to a vertical position.

#### STEEL STOOLS

**S**TEEL stools, available in five heights and 80 models, are now being marketed by Lyon Metal Products, Inc., Aurora, Ill., according to an announcement.

The 80 models have been designed from a physiological standpoint to meet every posture need in industrial and commercial plants, it is stated, and to aid in increasing employee efficiency and reducing fatigue.

A 26" model is equipped with an adjustable back and pressed wood seat (over steel) and steel feet. The back support may be attached to all models.

#### FOR FLOOR MAINTENANCE

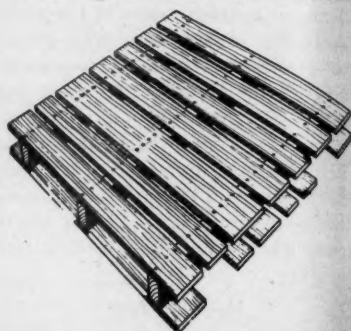
**F**INNEL SYSTEM, Inc., manufacturer of floor maintenance equipment and supplies, Elkhart, Ind., announces the Finnel model 84-XR Industrial Dry Scrubber. Designed to clean grease-caked floors with least effort, this model is equipped with two scarifying brushes that quickly dig out embedded dirt, shavings and other forms of soil. Industrial floors thus thoroughly cleaned, states the manufacturer, are productive floors that help speed trucks, and hence production.

The mechanized dirt removal method is said to require only a fraction of the time used with hand-spudding. It is not necessary to remove the brushes in order to re-

sharpen them, according to the manufacturer. The Finnel 84-XR has a switch which reverses the brushes, and the resharpener is automatically done by the reversed motion. The machine is said to be adapted to wet-scrubbing, steel-wooling, waxing and polishing.

#### PALLETS AND SKIDS

**S**HIPPING pallets and skids are now being manufactured by the General Box Company, Chicago, according to a recent announce-

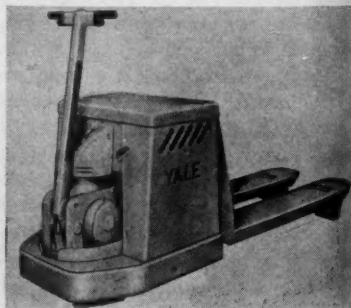


ment. The company's General Box Pallet will be known as the "Generalift."

Problems of handling and shipping, which can be solved by the adoption of pallets, will be studied by General Box engineers. And on the basis of findings "Generalifts" will be designed to meet individual needs, according to a statement made by company officials.

#### ELECTRIC LIFT TRUCK

**T**HE Yale and Towne Manufacturing Co. now offers the new Worksaver Electric Truck, which is equipped with power for lifting and power for travel. The truck is said to enable a man or woman operator to pick up and "walk off" with



loads up to three tons merely by using finger-tip pressure on dual cam controls located immediately beneath the hand bar-grip. The controls are returned to neutral

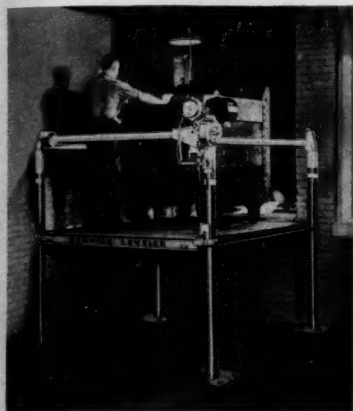
to the 84-XR uses the reversing is designed to be steeling.

upon release of finger pressure, and two forward and two reverse speeds are provided, it is stated. When a load is deposited, a special type of hydraulic release check cushions the descent, which is said to be designed for the protection of the operator, the load and floor.

The manufacturer states that the Worksaver is available in two types—platform and pallet. The former is designed to handle single unit loads (a crate, bale, etc.), or multi-unit loads on skids or in skid bins up to 6,000 lbs. The latter is designed for single or multi-unit loads which are palletized and weigh up to 4,000 lbs.

#### SERVICE LEVELER

THE Service Leveler, a new product of Service Caster and Truck Division of Domestic Industries, Inc., Albion, Mich., and



Somerville, Mass., is said to be designed for three handling operations. These are, according to the manufacturer:

1. Raising finished goods from the floor level to the loading platform.
2. From the shipping floor to the motor truck.
3. Lowering of raw materials from the freight car to the floor.

It is also stated that the device is useful for other loading and unloading operations. It can be installed inside or outside, on an upper floor or over a basement, according to the manufacturer, and incorporates a number of advanced safety features.

Control of the platform travel to full height or to floor level is governed by an automatic traveling nut and flat cam mechanism that stop the motor automatically at top height and floor level. Inter-

mediate stops are manually controlled by the switch.

#### VIBRO-LEVELERS

A COMPLETE line of rubber-insulated dual purpose machinery mountings for stopping vibration and for leveling machinery is featured by Bushings, Inc., Royal Oak, Mich.

The new mountings are known as Vibro-Levelers and are manufactured in nine sizes ranging in load capacities of from 10 lbs. to 2,000 lbs. each. According to the manu-

facturer, they are designed for use on such noise and vibration producing equipment as punch presses, compressors, blowers, forging hammers, grinders, buffers, etc. Brackets, available in various capacities, are said to permit installation of the mountings without materially raising the elevation of the machine.

Since the insulating material is made of synthetic rubber, it is not liable to attack by oils or greases and thus can be used under virtually any conditions, according to the manufacturer's announcement.

## Another NEW Model... Combined Transporting and Tiering Truck

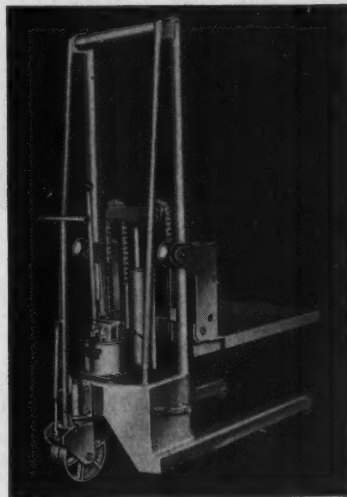
Elevating range, capacity and ease of manipulation, combined with strength and lightweight, make the

## LYON-Raymond 2000 Lbs. Capacity HIGH-LIFT TRUCK

A MOST VERSATILE TRUCK FOR GENERAL PLANT USE. FAST, SAFE AND ECONOMICAL.

- Welded tubular and formed plate construction. 30"x36" platform, elevating range 6" to 60", capacity 2,000 lbs. Elevated by two-speed hydraulic hand pump. 10" front and 5" rear wheels, Timken bearings, fifth-wheel steering, foot-operated floor lock.

Adaptability of this truck made even more efficient by optional accessories: Die Separator, Winch, Removable Roller Platform, and motor-driven Hydraulic Pump.



Above: 2,000 lbs. capacity model. Available also in smaller model of 1,000 lbs. capacity.

In addition to transport and tiering, used extensively for positioning work in lathes; supporting overhanging work; work table; truck loading and unloading.

Write today for Bulletin #136A.

**LYON-Raymond Corporation** 467 Madison St.  
Greene, N. Y.

Material Handling Equipment... Engineered Hydraulic Devices



#### BITE WITHOUT TEETH

**T**HE Boyer Campbell Co.'s Safety Division, Detroit, is introducing a device (cam-lever mechanism and chain) that grabs up heavily loaded barrels, steel plate, etc., and holds them in a vise-like grip. The device, to be known as "Granny Grip," is said to have a "strong bite without teeth," because the grip grows tighter as the load gets heavier, it is claimed. The standard unit consists of two stamped alloy steel bodies (cam

lever mechanism) and Herc alloy chain that is said to be capable of lifting any load over which the  $\frac{3}{4}$ " jaws can be slipped.

"Granny Grip" is particularly designed to facilitate handling of material with industrial trucks and cranes. The grip is released as soon as the load is put down, states the company.

The larger photo shows that the device can handle two barrels at a time, while the inset illustrates how to attach the grip.

#### CRANE BRAKE CONTROL

**A** NEW brake control unit, recently developed for the Wagner Type BM crane-bridge is claimed to provide automatic "cushioned" emergency stops when power fails or the crane runs be-

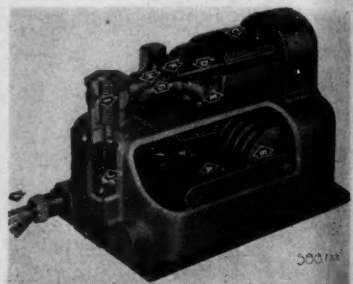
yond safe limits on the runway. Announcement of the new unit was recently made by the Wagner Electric Corporation, St. Louis, Mo.

The manufacturer states that this break control device permits free use of the foot-controlled hy-

draulic brake for service stops, while at the same time it also holds the parking-brake setting-spring compressed and ready to apply in an emergency.

The stop valve of the control unit applies the brake at a predetermined rate to bring the bridge and its load to a quick and smooth stop, it is claimed, without undue swinging of the suspended load.

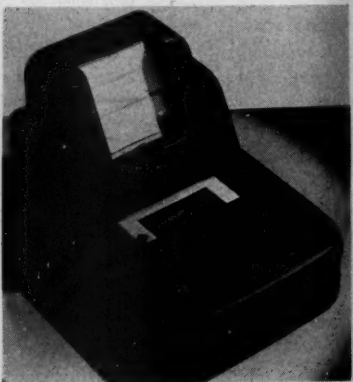
The brake is automatically applied when the operator pulls the main line switch, which he does on



taking the crane out of operation. To release the brake, the operator merely makes a full application of the foot pedal. This compresses the brake-setting spring, and the control unit holds it compressed until the electric circuit to the unit is opened.

#### COMMUNICATIONS SYSTEM

**P**ICTURED is the TelAutograph Telescriber, a product of the TelAutograph Corporation, New York. According to the company, the apparatus is used to help speed requisitioning and material handling operations, also in a vari-



ety of related functions, including inventory control applications. The telescriber model shown here transmits data instantly in writing to one or more points, according to a recent company release.



## GANTRY FRAME

**T**HE Shaw-Box Crane and Hoist Division of Manning, Maxwell and Moore, Inc., has just placed on the market a new mobile load handling device that operates on the floor. Of 2000 lbs. capacity, the unit is being marketed under the trade name "Budgit Gantry 'A' Frame."

The device is available as a complete unit as shown in Figure 1, or as an assembly which includes all parts, except the I-beam. The latter may be obtained locally. The assembly is illustrated in Figure 2.

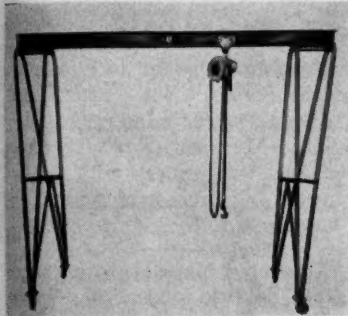


Figure 1.

When purchased as an assembly, the Frame may be completed in one hour. The I-beam may be mounted either on top of the gantry legs (Figure 1), or it may be suspended from them.

The unit is designed so that either a chain block or electric hoist suspended from an I-beam trolley may be employed as the hoisting unit. The complete assembly

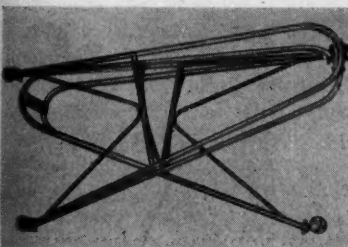


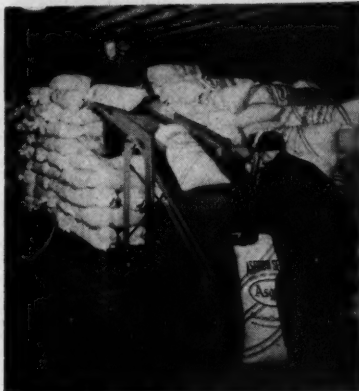
Figure 2.

weighs 270 lbs., according to the manufacturer. Over-all height of the frame with the I-beam mounted on top of the legs, 10' 0"; clear space beneath the I-beam, 9' 6"; clear space the entire height inside of gantry legs, 9' 4 3/8"; width at floor, 5' 4"; over-all length, 12' 6".

## PILING EQUIPMENT

**T**HE Standard Handipiler, product of Standard Conveyors,

North St. Paul, Minn., is designed for loading, unloading, stacking and elevating sacks, boxes, cases and cartons, according to a recent release. Models are made in sizes for



stacking up to 15 ft. for cartons. The machine's relatively small base frame makes it suitable for operations in confined areas, it is claimed. All casters are ball bearing, swivelled, with roller bearing wheels, and by means of floor locks the machine is locked in position while being used. The upper end of the piler is adjustable to any position

within its range, either from the floor or on the pile.

The carrying apron is reversible for conveying commodities up or down. The machine is said to be capable of handling individual units weighing up to 100 lbs. each, or a total uniformly distributed load of 25 lbs. per foot. Commodities which can travel at a 28° angle can be carried, it is stated.

## CASTERS

**F**AULTLESS Caster Corporation, Evansville, Ind., announces availability of their new No. 1300 Series Super-Dreadnaught caster for general industrial purposes. The caster will roll and swivel under loads up to nine tons, according to the company.

The product quickly proved its time and labor saving advantages in wartime production, it is stated, and today it is applicable to assembly lines for agricultural machinery and other heavy and bulky equipment. The new Faultless 1300 Series is specially designed to move the heavier loads while protecting floors and cutting production costs, according to the manufacturer's release.

## HAZARDOUS JOBS...MADE SAFE WITH MATERIALS-HANDLING PLATFORMS AND SEMI-LIVE SKIDS



PROTECT EMPLOYEES  
REDUCE WORKER FATIGUE  
BUILD BETTER MORALE



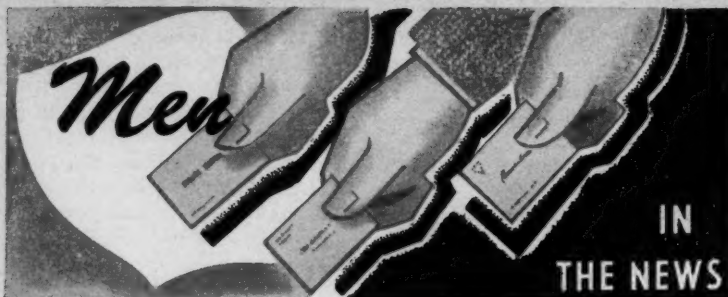
IRONBOUND BOX & LUMBER CO., 55 Hoffman Place, Hillside New Jersey

Kindly send me bulletin 40 - "Skid Platforms and Semi-Live Skids as an aid to Efficient Production, Safety and Economy."

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*This catalog might help us - let's get one + see.*  
Ed.



**R. N. Landreth** has been appointed assistant to the vice-president of the general machinery division of the Allis-Chalmers Manufacturing Co., according to a recent announcement by Vice-President **W. C. Johnson**. Mr. Landreth, who has been a special representative of the company, will continue to live in Washington and will function on assignments from Milwaukee.

Elected President of the Caster and Floor Truck Manufacturers Association at its annual meeting on October 11 in Hotel Cleveland, Cleveland, O., **Charles M. Mead**. Mr. Mead is vice-president and sales manager, Truck Wheel and Caster Division, Divine Brothers Company, Utica, N. Y.

The association is a national organization of material handling equipment manufacturers, with headquarters in Chicago. During the war the association was active in aiding both government and industry in the adoption of proper standards for material handling procedures. Currently it is working with the Surplus Property Division, U. S. Department of Commerce, in connection with the disposal of surplus material handling equipment.

Appointed district manager of the Reliance Electric and Engineering Co., Gary, Ind., **Harold J. Thompson**, according to an announcement by **R. O. Herbig**, Central Western Sales Manager.

With his headquarters in the Gary National Bank Building, Mr. Thompson will serve the industries of the Calumet and Northern Indiana district.

Newly appointed personnel director of Robins Conveyors, Passaic, N. J., **Hugh Avery**. Having been in personnel work for a number of years, Mr. Avery was previously in

charge of employment at the Lake Erie Engineering Corporation, Buffalo, N. Y., and has also served in the Buffalo office of the United States Employment Service. He is a graduate of Washington and Lee University, where he specialized in business administration.

To serve the fast-growing industrial south, Robins Conveyors, Inc., Passaic, N. J., opened its new offices in the Brown-Marx Building, Birmingham, Ala. November first was the opening date, according to an announcement by the company's President **Thomas Robins, Jr.**

The equipment manufacturer's Alabama headquarters is under the direction of **Charles A. Thompson**, who served the company before the war as a sales engineer in the Pittsburgh office. On active duty in the Navy since 1942, Lieut. Commander Thompson was discharged October 15. In his new position he will work with Robins Conveyors' agents in all southern states east of the Mississippi.

Appointed General Sales Manager of the TelAutograph Corporation, New York City, **Roy J. Keller**. His headquarters will be in New York. Prior to this promotion, which coincided with his twenty-first anniversary of service with the company, Mr.



**Roy J. Keller**

Keller served as manager of the St. Louis office.

**Harry A. Lawrence** was transferred from his post as Cleveland Branch Manager to serve in the same capacity at the Newark Office. Mr. Lawrence has been associated with TelAutograph since 1921.

**Edward C. Campbell** succeeds

Mr. Lawrence as manager of the Cleveland branch. Before joining the communications concern, Mr. Campbell was Cleveland manager for the North Star Woolen Mill Company.

**Lewis J. Male**, assistant general superintendent of General Electric's Schenectady Works, has been appointed General Superintendent, effective October 1, according to an announcement by **J. M. Howell**, Works Manager. Mr. Male succeeds **Bernard G. Tang**, whose retirement September 30 concluded 45 years of service with the company.

Appointed Director of Purchases of the Service Caster and Truck Division, Domestic Industries, Inc., Albion, Michigan, **Paul W. Sherman**. He was formerly with the Armored Tank Division of the Pressed Steel Car Co., Inc.

Appointed general sales manager of The Baldwin Locomotive Works, Philadelphia, Pa., **Robert G. Allen**, according to an announcement by **Ralph Kelly**, Baldwin's president. Mr. Allen joined the Baldwin organization as general manager of the company's Southwark Division in March of 1945.

Robins Conveyors Inc., Passaic, N. J., announces the addition of **A. P. DeVitta**, East Paterson, N. J., to the sales staff.

For the past 10 years **De Vitta** has been with Wright Aeronautical Corp.

At a meeting of the Board of Directors at the Macwhyte Company, Kenosha, Wis., **R. P. Tyler** was elected to fill a vacancy caused by the resignation of Mrs. George S. Whyte.

**R. P. Tyler** is also general sales manager of the company, which is engaged in the manufacture of wire, wire rope, slings, aircraft cable, terminals, and tie rods.

Appointed vice-president for material planning of the Glenn L. Martin Co., Baltimore, Md., **G. T. Willey**. This, a new vice-presidency, was recently created as a part of far-reaching changes in the company's organizational set-up. Chief purpose of the organizational revision was to meet peacetime demands for more efficient production

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and to reduce overhead to a minimum, according to President Glenn L. Martin. The reorganization was carried out under the direction of Harry T. Rowland, first vice-president, with the cooperation of other members of top management.

Mr. Willey was formerly a vice-president and general manager of the Martin-Nebraska Company. The new division he heads is not only responsible for material planning and procurement, but for quality control as well. J. P. Bailey heads the quality control department, responsible for inspection; F. O. Muller, the procurement department, and R. L. Evans, the production planning and material control department.

## LETTERS TO FLOW...

(Continued from page 4)

cloth rolls are 38" in width, about 13" in diameter and weigh around 70 lbs. each.—John W. Clark, President, Locke Cotton Mills Co., Concord, N. C.

### To FLOW: Scrap Problem

In the October issue of FLOW, page 61, lower left-hand corner is an illustration of a semi-trailer for picking up scrap, which can be dumped by lifting the fifth wheel.

Please put us in touch with the company that makes this.—B. C. Skinner, Manager, B. C. Skinner Machinery Co., Dunedin, Fla.

Glad to oblige.—Ed.

### To FLOW: Wants Photo

The October issue of FLOW was read by the writer with great interest. It parallels somewhat a project upon which I have been engaged for several months; namely, a survey of handling practices presently in use in the printing and converting trade.

It is our intention to produce a booklet in the near future summarizing the information obtained. To this end I would like to obtain a glossy print of a photo in your magazine. It is Figure 2, page 58, under the heading "Small Plant Installations."—J. K. Barry, Fraser Paper Limited, Madawaska, Me.

Can, and did do.—Ed.

# CENTRALIZED • MATERIAL • HANDLING

THE White Motor Co., Cleveland, is constantly solving new problems in production and control so that its numerous operations may be synchronized and directed into a coordinated flow of material—through processing and assembly into finished products.

## METHODS CHANGE WITH TIMES

The demand for increased volume and for new variations in products disrupted old routines. As a result, the control of operations, as well as plant facilities, had to be changed to meet this demand. This wasn't done overnight. Some phases of production received attention to the detriment of others, and it was not until the fall of 1944 that material handling problems, as such, were met head-on with a completely new set-up.

Prior to that time, material handling was a problem that had to be dealt with by the personnel of each department. When a department was finished with its handling, it was up to the next one to move the material.

An analysis of the handling throughout the plant prompted the management to centralize all material handling activities and to create a special department for this purpose. A foreman was placed in charge, and he assigned handlers to the departments as needed. The new Material Handling Department provided flexibility in the use of the equipment, and was also able to deal immediately with problems as they arose. (The material handling foreman was considered so important that he was given No. 1 on the call box system.)

Previous experience had shown that truckers did not coordinate their efforts to handle volume effectively; and the transfer of parts and material suffered. Hence it be-

came the duty of the material handling foreman to instruct the truckers in how to transport, what and when to move, and where to store. In this way the proper equipment and the right number of workers were provided for each operation.

Convenient areas were set up for storing empty skids, and trucks were assigned to specific stations. The same planning provided definite locations for tractors, hand-lift trucks and other mobile equipment.

## MAINTENANCE, COSTS

To further their efforts along this line, The White Motor Co. also established a maintenance department for its mobile equipment, which was stocked with replacement parts. When a powered or hand-operated truck breaks down the necessary replacement part is usually available, enabling the vehicle concerned to return to work shortly. Broken parts or assemblies are immediately repaired, and motors are reconditioned so that one will be available for replacement when needed.

Some months after the new department was created, a control was set up to obtain maintenance costs. This division is staffed by eight men, whose duties extend not only to trucks, but also to conveyors, cranes and similar equipment. The company will doubtless benefit considerably from the maintenance cost data developed.

The Material Handling Department began to pay dividends almost immediately after its creation. Not only has the flow of material and work in process been greatly improved, but production has increased substantially as well.

There is no better argument for a centralized Material Handling Department.



# Aids to Better Production



Item NS-428

## Machine Tender on Wheels \$2350

Built entirely of sheet steel and angle iron, with tubular handles. All welded construction. Overall dimensions: 30" long, 16" wide, 32" high. Top deck 2" deep, lower deck 3" deep. All deck edges turned to eliminate roughness. Four 5" x 1" steel wheels, rigid in front, swivel in rear. Finished in standard P.S. gray. Weight approximately 65 lbs.



Item NS-577

## Slag Cart \$7850

For handling slag, pig iron, hot castings, forgings and other heavy materials. Built of 1/2" plate with heavy angle iron legs. Tubular handles continue around bottom of frame to form a rocker-shaped bumper at front to facilitate ease of dumping. Reinforcing bar of 3/4" steel is welded around top edges of all four sides. Two 18" x 3" wheels, roller bearing. Overall dimensions: 35" wide, 67" long, 26" high. Body dimensions: (Top) 29" wide, 43" long, 16" deep; (bottom) 24" x 24". Weight approximately 425 lbs.



## Double End Truck

General purpose push truck, with hardwood platform 52" long by 27" wide. End racks are steel, with push handles 36" from floor. Four 6" x 2" metal caster wheels—two swivel, two rigid. Finished in standard P.S. gray.

Item X-114-M (Metal Wheels) \$3750

Item X-114-R (Rubber Tired Wheels) \$4400

## Turn Table Tilt Truck

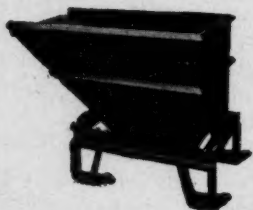
Item NS-21



A sturdy utility truck for factory or warehouse. Turns in its own radius. Platform built of 1 1/2" hardwood, 48" long, 28" wide, 10" off floor. Reinforced at ends and across middle with bolted-on 1 1/2" hardwood timbers. Four ball-bearing wheels make travel easy. Center wheels are 6" diameter, rigid; end wheels are 1 1/2" x 1 1/2" x 3/8" angles, with 1 1/2" x 3/4" bar stock welded braces. Handle is 1" pipe. Standard P.S. gray finish. Weight approximately 75 lbs.

Item NS-21-M (Metal Wheels) \$3150

Item NS-21-R (Rubber Tired Wheels) \$3800



## Automatic End Dump For Use with Lift Truck

For handling hot metal parts, scrap, stampings, other heavy materials. Rockers geared to the truck. Self-sealing, smooth operating. Built of heavy steel plate, reinforced with sturdy angles. All welded construction. Two standard sizes.

Item S-878-A Capacity 1/2 cu. yd. Approximate weight 600 lbs. \$8500

Item S-878-B Capacity 1 cu. yd. Approximate weight 750 lbs. \$9500

Be sure to give floor clearance of your lift truck when ordering.



## Wood Box—Tilt Type Metal Bound

General utility push truck. Half-inch tilt for easy wheeling and short turning of corners. Four 5" metal casters—two rigid, two swivel. Two standard sizes.

Item PS-91-A 24" wide, 36" long, 26" high overall. Weight, 185 lbs. \$2950

Item PS-91-B 28" wide, 48" long, 30" high overall. Weight 260 lbs. \$3350



Item NS-934

## Side Dump Trailer Truck \$35000

For hauling metal shavings, light scrap, rubbish, etc. Simple pivot design eliminates need for gears, and allows dumping of load to either side. Locking pin holds body upright for loading and hauling. Capacity approximately 2 cu. yds. Recommended load rating 3 tons. Overall width of 34" enables easy handling through narrow aisles. Framework is of structural channel iron. Body, 1/4" boiler plate, reinforced at pivot points; top edges angle reinforced. All welded construction. Inside body measurements: 30" wide, 96" long, 36" deep. Pull bar 30" long. Overall measurements: 9' long (exclusive of pull bar) 34" wide, 56" high. Four 12" x 4" metal wheels, roller bearing, rubber tired. Fifth wheel construction. Weight approximately 1400 lbs. Finished throughout in standard P.S. gray.



Item NS-506

## Combination Truck and Drain Rack Loads Automatically

As truck is tilted against drum, steel fingers grip the flange at top. Loading is completed as truck is rock back to wheeling position. Free-rolling wheels make light work of trucking the heaviest drums. Slight downward push on handles tips truck on floor with wheels raised free, thus providing convenient draining position. Heavy angle iron frame, tubular handles, all welded construction. Two 8" roller bearing wheels. Weight approximately 90 lbs.

Detachable Handles. When used to drain or storage rack, handles can be detached. Thus conserving floor space and permitting one pair of handles to serve any number of trucks.

Item NS-506 \$4250

(Handles welded to frame)

Item NS-506-DH \$4450

(Truck and detachable handles)

Item NS-506-R \$3250

(Item NS-506-DH without handles)

Item NS-506-H \$1200

(Detachable handles only)



Item NS-948

## Book Truck for Curing Rubber

Also serves in the production of plastics and other products. Shelves are made of sheet steel, crimped to provide high rigidity. Long, stiff extension springs assure easy raising and lowering of individual shelves. When raised, shelves automatically stay in tilted position. Heavy casters permit easy moving. Custom built to exactly fit user's product and plant requirements.

Production economy is the purpose behind the P.S. line of materials handling equipment . . . for pick-up, loading, moving, dumping or storage . . . built of metal, or wood, or combination. Tell us your problems . . . our engineers will gladly recommend equipment fitted to your plant and product.

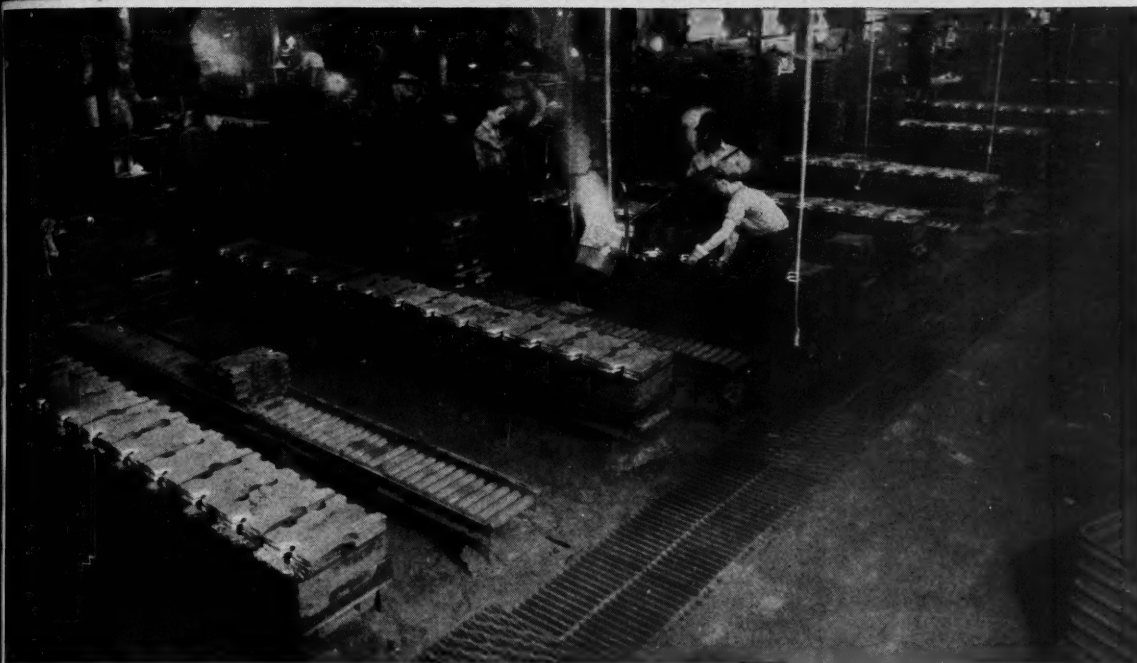
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All prices f.o.b. Detroit.

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# Mathews

## ROLLER CONVEYERS

*Engineered  
to serve Production*



Roller Conveyor for foundry application should be designed to withstand severe service. The rollers must be rugged and free-running, and the bearings should be protected from grit and dirt. If the conveyers are located in a pouring zone, shotguards should be used on the ends of the rollers. Mathews Engineers have devoted much time and effort toward developing an

outstanding Roller Conveyor design for foundry application. There is a Mathews Engineer operating in your vicinity. Ask him about Roller Conveyor and the many other types of Mathews Conveyers which have been engineered for foundry service. He will show you why Mathews Conveyers are able to stand up under the most severe foundry applications. Write or wire today.

**Mathews Conveyor Company**  
ELLWOOD CITY, PENNSYLVANIA



HANDLING+Processing+HANDLING+Assembling+HANDLING+Packing+HANDLING+Storage+HANDLING

HANDLING—the Common Denominator of PRODUCTION



LET MEN DIRECT POWER—NOT GENERATE IT!

**Hazards in handling** operations emphasize the need for mechanical handling equipment. Workmen ought not to be exposed to the risk of strain and injury when this work can be accomplished far more safely, in less time and at lower cost with the proper equipment.

One man, directing Towmotor power, can lift, move and stack larger, heavier loads without increased effort and in complete safety. The Towmotor DATA FILE gives complete details. Your copy will be sent upon request.



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